DOCUMENT RESUME

ED 255 142 HE 018 197

AUTHOR	Garke, Esther
TITLE	Higher Education in Switzerland. Monographs on Higher Education.
INSTITUTION	United Nations Educational, Scientific, and Cultural Organization, Bucharest (Romania). European Centre for Higher Education.
REPORT NO	ISBN-92-3-102292-X
PUB DATE	84
NOTE	86p.
AVAILABLE FROM	European Centre for Higher Education, United Nations Educational, Scientific, and Cultural Organization, 39 Stirbei Voda Street, Bucharest, Romania.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	*College Administration; *College Admission; College Faculty; College Programs; Degrees (Academic); Educational History; *Educational Policy; Enrollment Trends; Expenditures; Foreign Countries; *Higher Education; Majors (Students); Public Education; Research and Development; *Student Characteristics; Technical Institutes; Universities
IDENTIFIERS	*Switzerland

ABSTRACT

The federal system of higher education in Switzerland is described. Consideration is given to: the links between the second and third cycle education that facilitate access to higher education; the system of examinations and diplomas; research; university libraries; nontraditional education; and working conditions for faculty. After summarizing the history of higher education in Switzerland, attention is directed to education, research, and service roles of colleges, and the relationship of the university and the labor market. Information is provided on: degrees awarded, the university sector, higher technical schools, teacher education, advanced study, the Federal Institute of Technology, admission criteria for the different sectors, university certificates and licenses, characteristics of students by sector, college administration and finance, scholarships, and international relations at the university level. Appendices include curriculum descriptions and data on: the number of teachers, students, and college graduates; the number of students by field of study and sex; proportion of women in university education; full-time teachers by discipline, 1983; and research and development expenditures by discipline and number of teachers, 1975. (SW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED255142

MONOGRAPHS ON HIGHER EDUCATION

Higher Education in Switzerland

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

CEPES

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

unesco
CEPES
European Centre for Higher Education

CEPES is the acronym for CENTRE EUROPEEN POUR L'ENSEIGNEMENT SUPERIEUR (European Centre for Higher Education). It is an integral part of the Unesco Secretariat, with headquarters in Bucharest.

The Centre was created in 1972 to contribute to the development of higher education in the 37 Member States of the Europe Region (including Canada, USA and Israel) by promoting international co-operation in this field.

unesco

CEPES

CEPES works in three main domains: information, communication and co-operation:

- it gathers, processes and disseminates information in different forms (the quarterly journal *Higher Education in Europe*, studies and monographs on national systems of higher education, and other specific topics);
- it organizes meetings, seminars and symposia and initiates or collaborates in joint studies on contemporary problems of higher education;
- it maintains relations with various organizations and institutions, both national and international, governmental and non-governmental, which are concerned with higher education

ISBN 92-3-102292-X
© UNESCO 1984

The English version of this monograph, which was published by CEPES in 1981 (ISBN 92-3-201931-8), was prepared for the journal „Western European Education" and is reproduced in the CEPES series with the kind permission of M.E. Sharpe, inc. Publisher.

This monograph has been printed with the support of the Swiss Federal Office for Education, the Pro Helvetia Foundation and the Swiss Federal Department of Foreign Affairs.

UNESCO

Higher Education in Switzerland

Dr. ESTHER GARKE
edited by: W. VOLLMANN (CEPES)

CEPES
Bucharest 1984

TABLE OF CONTENTS

	Page
Preface	5
Introduction	6
1. The Development of Higher Education in Switzerland: Historical Perspective	7
2. Goals and Tasks of Higher Education	11
2.1. Education, Research, Services	11
2.2. The University in the Labour Market	13
3. Structures of the Swiss Educational System	15
3.1. The Different Degrees	15
3.2. Higher Education	17
3.2.1. Universities	17
3.2.2. Libraries	18
3.2.3. Federal Institutes of Technology	19
3.3. Non-university Tertiary Sector	19
4. The Education Available in the Tertiary Sector	22
4.1. Universities	22
4.2. Advanced Study Recurrent Education	23
4.3. Federal Institutes of Technology (EPF)	23
4.4. Non-university Sector	25
5. Conditions for Admission to Higher Education	28
5.1. Universities	28
5.2. Federal Institutes of Technology (EPF)	29
5.3. Non-university Tertiary Sector	30
6. Completion-of-Study Examinations and Diplomas	31
6.1. Higher Educational Institutes (Hautes Ecoles)	31
6.2. Non-university Tertiary Sector	33
7. The Students	35
7.1. Higher Educational Institutes	35
7.1.1. Lodging, Leisure Time	37

7.2. Non-university Tertiary Sector 37
8. The Teaching Staff 39
9. Administration and Financing of Higher Education 41
9.1. Administration 41
9.2. Financing 42
9.3. Scholarships 43
9.4. Encouragement of Research 44
10. Future Evolution of Higher Education 46
10.1. Quantitative Development 46
10.2. Qualitative Development 48
11. International Relations in Higher Education 50
List of Appendices 52
Tables 1—10 53
Appendix 11, Curricula 62
Appendix 12, Addresses of Institutions of Higher Education 78
Notes 79
Bibliography 80

PREFACE

This volume is a further addition to the CEPES monograph series on European systems of higher education. It is a faithful translation of the original French version of the text which actually constitutes volume 2 of this series. Indeed CEPES is much indebted to the journal "Western European Education" for having firstly translated and published the English version (summer 1983/Vol. XV, No. 2) and secondly, having given permission to CEPES to publish the same translation in its own series.

This monograph informs the reader, whether he be a university administrator, teacher, researcher or student, about the principal objectives and the basic structure of the Federal system of higher education in Switzerland. Stress has been placed on the links between the second and third cycle education which facilitate access to the various institutions of higher education ; on the system of examinations and diplomas ; on the role, place, and financing of research ; on the importance of university libraries ; on the nontraditional forms of higher education ; on living conditions and measures taken for the benefit of students, and on the working conditions of the teaching personnel. It has also dealt with topics relevant to administration and financing, to development trends in the system, and to international relations. The statistics in the Appendix cover the pattern of enrollment of students over the last fifteen years and give relevant percentages of students. Finally, a complete list of Swiss institutions of higher education is given.

The European Centre for Higher Education is, to a large measure, obligated to Dr. Esther Garke, the principal author of the study, and to Jean-Pierre Vauthey, who translated it into French from the original German. CEPES also expresses its thanks to the Federal Swiss Office for Education and Science for its fruitful collaboration which enabled us to complete this monograph in the most satisfactory manner. Wolfgang Vollmann is responsible for the final editing of the monograph in this form.

F. EBERHARD,
Director CEPES

INTRODUCTION

In accordance with the International Standard Classification for Education (ISCED) of Unesco, tertiary educational sector comprises the higher education that follows the first eleven to thirteen years of education and has a certificate for the completion of secondary education as a prerequisite. The tertiary education sector is usually entered at the age of 18 (in Switzerland, a bit later). This sector includes the universities, the schools of technology, the higher technical schools, the higher schools of economics and administration, the higher schools of agriculture, the teacher training schools, and the higher professional schools.

In Switzerland, there are ten higher educational institutions, eight of which are cantonal (seven universities, one college of economic and social sciences), and two federal institutes of technology (see appendix 12).

The non-university tertiary sector is made up of educational institutions financed in part by the public sector or interest groups, and in part by private funds. According to a study by the Swiss Council of Science, this sector offers about 180 courses of education, differing in their requirements, their curricula, and their organization. Common to all is the fact that they are linked up with courses of education in higher secondary education and that their students must in general be at least 18 years old. The documents used in compling this report, in particular the studies by the Swiss Council of Science, are indicated in the Appendix.

1. THE DEVELOPMENT OF HIGHER EEUCATION IN SWITZERLAND: HISTORICAL PERSPECTIVE

The university, with its institutions and its spirit, is a creation of the Middle Ages. The economic and social transformations of the twelfth century gave birth to schools in the cities which distinguished themselves from the convent schools, marked by a conservative spirit and in the grip of feudalism, and later gave rise to the universities.

A new epoch commenced with the humanism of the fifteenth and sixteenth centuries. It was during this period that the first Swiss University, at Basel (1460), was founded. The Reformation brought about a deep-going reorganization of university life; the period from 1550 to 1620 is considered the golden age of the University of Basel. An era of slow decline commenced with the Thirty Years' War for almost all the universities of old Europe. A new evolution did not begin until the nineteenth century, a period which also saw the founding of most of the other Swiss universities.

In 1833, the canton of Zürich created its own university, and one year later, Bern followed Zürich's example. In Bern as well, it was possible to establish the university on the basis of an old institution, the school of theology, which had been developed and transformed into an academy in the eighteenth century. In 1835 Geneva also reorganized its academy, which had been founded by Calvin. Initially, the *Schola genevensis* was a seminary of theology and pedagogy, but with the extension of Calvinism it became a European intellectual center of importance, its influence extending throughout the world. It was transformed into a university in 1873, following the example of German Switzerland; three years later, a faculty of medicine was added to the original disciplines. In 1890, Lausanne in the same way transformed its academy into a university when a faculty of medicine was established; the origins also went back to a school of theology created in the sixteenth century. In 1889, the University of Fribourg was founded. The faculty of law was the outgrowth of a school of law dating from the eighteenth century; in 1890 the faculty of theology and in

1896 the faculty of natural sciences were added to this faculty and the faculty of philosophy created in 1889. The school of advanced economic and social science of Saint Gall was created in 1898. The youngest of the universities in our country is the University of Neuchâtel, which was founded in 1909. It was preceded by an academy founded in 1838.

Our universities may with good reason be said to be creations of the nineteenth century if one considers that it was at this time that they underwent crucial transformations and restructuring both at the organizational level and in the domain of ideas. The ideal image that has emerged of the new Swiss university, from the reorganization of the University of Basel in 1818 to the creation of the universities of Fribourg and Neuchâtel, was faithful to the conception of the university based on the philosophy of idealism forged by Wilhelm von Humboldt. The new university consisted of four faculties all enjoying equal rights; the faculty of law was expanded and an independent faculty of medicine was established. Freedom of instruction, tolerance, and autonomous administration were the indispensable preliminary conditions for the free play of the scientific mind, which from that time on was able to develop in our universities.

A consequence of the Humboldt conception of the university, which was at the basis of all our cantonal higher institutions, was that the technical sciences, which were principally oriented toward practical activities, could not penetrate into these institutions of higher learning. The creation of the Federal Institute of Technology *[l'Ecole polytechnique fédérale]* (EPF) in 1854 enabled the technical sciences to acquire a full-fledged status in our higher education. In 1968, the Confederation adopted the University Polytechnic School of Lausanne *[l'Ecole polytechnique universitaire de Lausane]* (EPUL), which had issued from the technical faculty of the university of Lausanne; the EPUL then became the second Federal Institute of Technology. Thus, today, the education of an engineer is entirely under the auspices of the Confederation.

After 1850, the existence of universities in German Switzerland could be considered as secure. The period that followed was marked by an internal consolidation accompanied by an external growth that was by no means regular, but continued up to World War I. The opening of university doors to women was a clear-cut expression of the liberalism that characterized Swiss universities.

While the period between the two world wars was on the whole devoted to a consolidation and a development of institutions established in the past, the years that followed World War II witnessed a truly unforeseen growth.

The growth in the number of students enrolled in universities in our country since the end of the century is shown in Table A (see also Tables 1 and 2 in the Appendix). This evolution and enthusiasm for higher education resulted in efforts undertaken by several cantons (notably Lucerne, Argovie, and Tessin) with a view toward constructing new universities. The euphoria of the 1960s was also followed by a certain disillusionment, and some projected new establishments were abandoned. The projected new establishments required the approval of citizens; thus in 1978 the planned establishment of a university at Lucerne was rejected in a popular vote. This was the expression of a certain skepticism

Table A

Students enrolled in Swiss colleges, by nationality, 1983/84

		BASEL	BERN	FRIBOURG	GENEVE	LAUSANNE	TH. FAK. LUZERN	NEUCHATEL	ST. GALLEN		ZURICH	EPF LAUSANNE	EITH ZURICH	TOTAL
									HSG	PHS				
1974/75	T	5151	6547	3489	7316	4412	159	1640	1898	.	11214	1841	6996	50663
	S	4469	6035	2488	4722	3170	141	1223	1424	.	9828	1030	5929	40459
	A/E	682	512	1001	2594	1242	18	417	474	.	1386	811	1067	10204
1975/76	T	5352	6810	3810	7510	4516	176	1727	1771	.	12068	1818	7065	52623
	S	4711	6324	2831	4924	3286	157	1367	1310	.	10554	1012	6034	42510
	A/E	641	486	979	2586	1230	19	360	461	.	1514	806	1031	10113
1976/77	T	5471	6863	3969	7849	4631	162	1753	1696	.	12791	1857	7156	54198
	S	4870	6435	2998	5139	3453	150	1412	1253	.	11166	1041	6196	44113
	A/E	601	428	971	2710	1178	12	341	443	.	1625	816	960	10085
1977/78	T	5532	6992	3999	8522	4796	164	1822	1691	.	13231	1920	7229	55898
	S	4983	6554	3076	5530	3575	146	1481	1226	.	11561	1063	6280	45475
	A/E	549	438	923	2992	1221	18	341	465	.	1670	857	949	10423
1978/79	T	5577	7158	3899	8868	5057	165	1860	1772	.	13928	1963	7363	57610
	S	5026	6704	3010	5826	3729	144	1509	1288	.	12192	1077	6429	46934
	A/E	551	454	889	3042	1328	21	351	484	.	1736	886	934	10676
1979/80	T	5623	7310	4009	9334	5233	175	1887	1889	.	14316	2001	7176	58953
	S	5093	6858	3060	6097	3859	155	1565	1396	.	12501	1137	6302	48023
	A/E	530	452	949	3237	1374	20	322	493	.	1815	864	874	10930
1980/81	T	5715	7601	4110	10049	5493	198	1928	1949	.	14786	2157	7388	61374
	S	5160	7135	3092	6533	3967	173	1556	1446	.	12860	1204	6520	49646
	A/E	555	466	1018	3516	1526	25	372	503	.	1926	953	868	11728
1981/82	T	6030	7808	4518	10316	5708	200	1984	2008	.	15452	2316	7556	63896
	S	5397	7337	3248	6691	4139	167	1606	1488	.	13430	1309	6664	51476
	A/E	633	471	1270	3625	1569	33	378	520	.	2022	1007	892	12420
1982/83	T	6303	7780	4704	10988	5819	211	2051	2088	.	15801	2478	7983	66206
	S	5642	7329	3444	7139	4285	176	1651	1561	.	13794	1454	7041	53516
	A/E	661	451	1260	3849	1534	35	400	527	.	2007	1024	942	12690
1983/84	T	6437	8245	4992	11292	6039	203	2101	2262	113	16905	2671	8579	69839
	S	5737	7756	3679	3303	4529	165	1698	1706	110	14932	1661	7568	56844
	A/E	700	489	1313	3989	1510	38	403	556	3	1973	1010	1011	12995

T = Total
S = Swiss
A/E = Foreigner

Source: BFS-SHIS/OFS-SIUS 1984

with regard to an excessive quantitative growth. It was felt that efforts should be concentrated henceforth more on a qualitative development of higher education. The *non-university tertiary sector* has developed at a rapid pace, especially during the 1960s and 1970s. The steady development of technology, the refinement of work methods and production procedures in enterprises and administrative bodies, and the requirements placed on the service professions require specialists with a solid education.

The *higher technical schools* especially underwent an extraordinary growth (see chapters 3 and 4). The eleven already existing day schools, which were in part enlarged and modernized, were joined by four new schools in 1964. New courses of education were also created: the technology of measurement and regulation, urban planning, planning of green areas, landscape architecture, and the graphics industry. In addition, in this area there are eight evening schools. For technicians, the possibilities of education in technical schools have been created in the course of the last few years. In 1975 the twenty-three recognized higher technical schools had a total of 6,886 students; 1,750 diplomas were granted. As a result of long-term planning, these schools, with modern equipment, will still have a sufficient number of study places in the years to come, so that one may be sure that the needs of the economy and the administrative apparatus for higher level cadres will be covered both quantitatively and qualitatively.

Six *colleges of economics and administration* were opened during the last two years (see chapters 3 and 4). They trained commercial employees devoted to the job of running a business, who will take positions in the economic and administrative sector.

Teachers receive their training in a teachers school, an educational establishment for teachers (see chapters 3 and 4), or the university, depending on the degree they wish.

The sector of *education in the social professions* grew considerably from 1960 to 1972.

The most frequent course of study was *professional apprenticeship ;* a good number of professions can be learned only in this way. Several *professional schools* preparing for higher education require a preliminary practical education, for example, an apprenticeship: this is the case, for example, in higher technical schools, colleges of economics and administration already mentioned, schools for technicians, schools for social workers, schools for librarians, schools for agricultural technology, and a number of specialized schools, such as the schools for catering, textiles, etc. These schools, like the professional schools directly following mandatory schooling (for example, the schools of commerce, the schools of arts and crafts) grew especially in the last decades.

2. GOALS AND TASKS OF HIGHER EDUCATION

2.1. Education, Research, Services

Even if the university has undergone some profound transformations over the course of the centuries, science and teaching, philosophical understanding and a revitalization of all knowledge accessible to man, authenticity, and humanity and a sense of right and justice have always been its overriding tasks.

The *unity of teaching and research* and *academic freedom* are the two principles that govern the internal and external organization of our universities. The principle of unity of teaching and research concerns professors as much as students, for it is only by participating in the process of scientific discovery that a person can acquire an authentic education and independent thinking. This end can be achieved only if academic freedom of instruction, study, and research is guaranteed.

The *function of research*, which distinguishes the university from other educational establishments and is one of its essential tasks, gives the university its internal dynamic, linked to progress in knowledge, and permits it to adapt continually to new conditions. The acquisition of new knowledge and the growth of knowledge is an essential task, and in Switzerland it is accomplished by the universities mainly, not by private research institutes. Through this function, the university makes important contributions to the cultural, political, economic, and technological development of society.

The quality of teaching is closely linked to the university's participation in the progress of research. The incentives that teaching receives from progress in research are indispensable; they motivate the scientific staff to participate in the process of research (see also chapter 9.4).

The university's *teaching mission* integrates the university into the overall system of public education. The university offers a student a professional and a general education. It conveys knowledge, skills, and methods and prepares the student to exercise a profession. The diplomas (licenses) and titles (doctor's degrees) which the university grants attest to success in university studies.

If our universities are orienting increasingly toward professional education, this is an adaptation that is necessary to the needs of a modern industrial society. But it is especially the growth of the natural sciences that has transformed the structure of the traditional university. The present development is marked by increasing technical research, which in its organization resembles that of large corporations. The regulations governing studies and examinations tend toward a rationalization of studies. Public opinion is demanding more and more a practical university education. The relationship to practice is not, however, received in a too strict manner. Professional training must also favor that aspect of action that makes it possible to adapt to rapidly changing conditions and needs. But it can do so only by teaching the individual to be autonomous within a specific professional field. This requires a link between professional education and "general education."

In the light of the growing specialization and the difficulties deriving therefrom as regards the conveyance of knowledge and work methods in certain areas of society, universities are today endeavouring more and more to deal with the practical problems of society. The relationship to practice required for teaching is also applicable to a part of basic research, commissioned research, and other scientific *services*. University professors can provide commissioned services to third parties (expertise for industrial enterprises or authorities) insofar as their teaching and research commitments are not hampered thereby. In speaking of the nature and tasks of universities, we should also mention their *cultural and political* function. As the intellectual centers of their region, they are the source of a cultural and political reaching out into public opinion. It is the job of the university to participate in the resolution of public problems and to determine, to make public, and to call to mind what is just and what is important. The contribution of universities in political, economic, and cultural matters has always been invaluable. Universities have played an important role in the development of our state.

We should point out that Switzerland ranks among those countries having the highest university density since we have one university for every 650,000 inhabitants. There are ten institutions of higher learning, four universities, and one Federal Institute of Technology in French-speaking Switzerland, which has six cantons and about 22 percent of the Swiss population. The other universities and the second Federal Institute of Technology are in German Switzerland, which has twenty cantons and semicantons and about 78 percent of the population. Italian Switzerland does not have a full university. This wealth of universities is a product of the historical evolution of our state. The creation of universities in French Switzerland, where all the cantons with the exception of Jura and Valais have their university, was a political phenomenon and the expression of a regional identity. The cantonal universities grew within the very confined space of their region and have retained its stamp. Each has its own character; they are not only places for education to academic professions, but also living cultural centres for the regions they subserve (see chapter 10).

2.2. The University in the Labour Market

The considerable growth in the number of students in Swiss universities (see chapter 7) in the course of the last few years is to a large degree the consequence of the development and growth of the secondary school and university system, a growth that was based on the individual demand for study openings. However, educational policy cannot be considered as being totally independent of the economy and the employment policy.

If in the course of the past few decades the public authorities have strongly favoured the development of secondary schools and universities, it has been to satisfy the growing needs of the economy and the state in academic matters. A complete subordination of university development to the needs of the society for manpower would be a state planning *[dirigist]* attack on our tradional liberal system, which offers free choice of studies and profession. The success of such an undertaking would also be uncertain. In addition, any forecasting of future university needs is beset by such a number of factors of uncertainty that wrong evaluations are not precluded (for example, forecasts concerning the need for doctors).

The liberal tradition of our political and economic system entails that the individual be responsible for the choice of his education and profession and prohibits any infringement of the freedom of the individual's decision. Indeed, the vocational guidance services and student guidance services inform study candidates not only about the studies that interest them, but also about the situation on the labor market. In no case, however, do they undertake to direct or screen candidates.

So far in Switzerland no signs of a considerable imbalance between the supply and demand for university education have been observed. In certain sectors there has been an overqualification with regard to professional work (see below). On this point it should be borne in mind that in addition to the classical types of scientific professions there are always new fields of interdisciplinary activity (for example, environmental protection, land management, development aid). Candidates for studies in Switzerland have, moreover, always reacted in a very sensitive and rapid way to fluctuations on the labour market. It is for this reason, it would seem, that excesses of university trained people in certain branches of study have so far been of relatively short duration.

University graduates are distributed as follows in the Swiss system of employment (the data referred to the last census of 1970) *(1)*: Almost 75 per cent of all university graduates exercising a professional activity are employed in the tertiary sectors. Three-quarters of them are concentrated in the sector of "health," "teaching and research", and "other services" (for example, expertise). A little more than a fifth of all employed university graduates have found a job in the secondary sector. For them the principal domains are chemistry, machinery, equipment, and construction. University graduates in certain branches have good chances to be able to exercise an independent activity. This is notably the case of university graduates educated as doctors, architects, lawyers, or psychologists.

Finally, according to estimates, about 50 percent of all university graduates exercising a professional activity are employed in the public sector (teaching and sciences, health, administration, etc.).

According to a study by the Swiss association for University guidance, *(2)* the current labour market does not present any extraordinary difficulties for university graduates. Nonetheless, the employment situation is not without its problems, especially for new graduates of Swiss universities. Most branches (with the exception of dental medicine and veterinary medicine, biochemistry, electronics, and business economics) are practically unaffected by problems of the labour market. The greatest difficulties concern the social and human sciences, especially psychology. The labor market conditions for a young university graduate are more unfavorable in French-speaking Switzerland than in German Switzerland. In addition, women, foreigners, and unmarried men and women encounter especial difficulties on the Swiss labor market.

During the next few years, the generations who will enter into active academic life will be larger than those who leave. Not only for demographic reasons, but also because of changes in the structures of the Swiss economy, there is a good chance that there will be an excess of manpower in general and of university graduates in particular. Despite this, the Swiss educational policy continues to be based on the demand for places of study (social demand) and not first and foremost on the needs of the economy (manpower demand).

3. STRUCTURES OF THE SWISS EDUCATIONAL SYSTEM

3.1. The Different Degrees (see diagram)

The term *preschool education* refers to the education of children between the ages of three and four, but, in particular, education during the year preceding school entry.

The term *primary school* refers to mandatory elementary instruction given to all children without distinction for individual capacity. Primary school lasts four, five, or six years according to the canton, and only three years in the canton of Vaud. After primary school, the child goes on to the first secondary level, referred to as a secondary school, *Realschule*, or observation school, depending on the canton.

The schools of *first secondary level* are lower secondary schools and pregymnasium schools. They last three, four, or five years according to the cantonal school structure, up to the end of mandatory schooling, and they prepare the pupil for a relatively high profession or a higher secondary school.

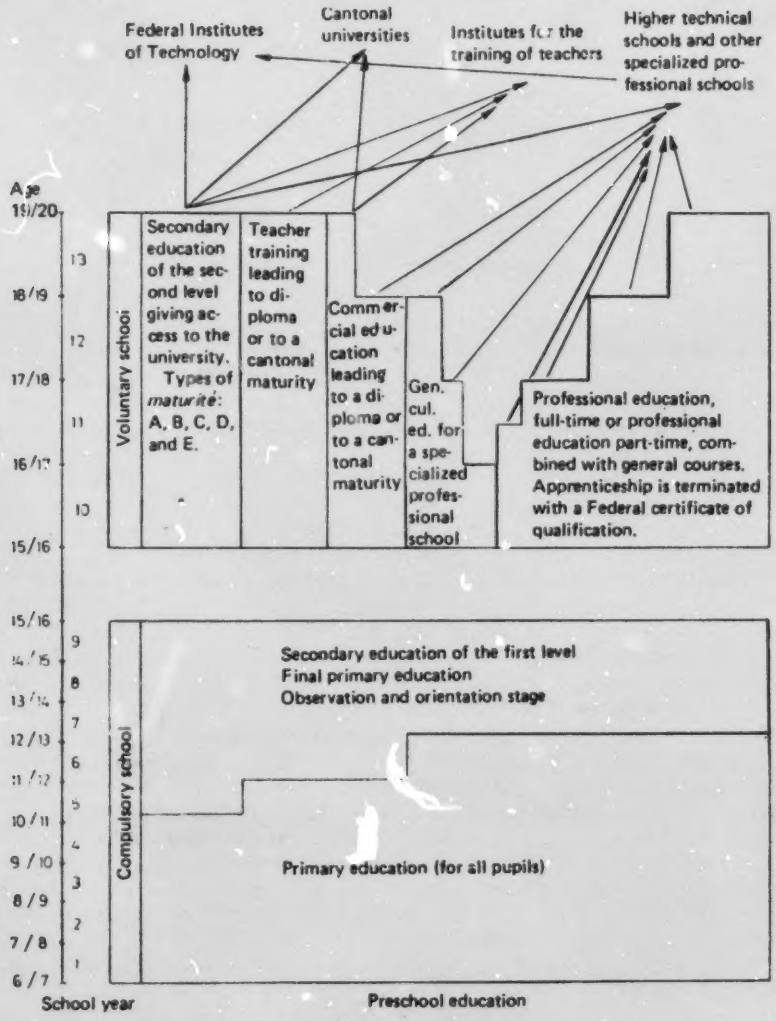
Higher secondary school comprises the years that follow mandatory schooling up to the diploma or the *maturité*.

Schools preparing for the maturité (called gymnasium, cantonal school, college, or lycée depending on the canton) directly follow on lower secondary school or secondary school and lead to a general *maturité* diploma giving access to the university. According to the Federal ordinance on recognition of the certificates of maturity *[l'ordonnance fédérale sur la reconnaissance de certificats de maturité]* (ORM) of May 22, 1968, the federal Council recognizes at present five different types of *maturitiés :*

Latin, Greek (A), Latin, modern languages (B), mathematics and natural sciences (C), modern languages (D), economic sciences (E).

In several cities, there are *higher secondary schools* with two or three courses per year and granting a final certificate. Their end is to deepen general education and prepare for specialized professional schools, notably in the paramedical, social, and pedagogical areas.

Diagram of School Education in Switzerland



BEST COPY AVAILABLE

Professional education refers to theoretical and practical education with a view toward a specific profession, as well as the general instruction that accompanies it.

The *universities* are institutions of an advanced level of education that comprise all the scientific faculties or are specialized in certain branches and, in addition to the education that they provide, also carry out research. As we have already mentioned, Switzerland has seven cantonal universities (Zürich, Bern, Fribourg, Basel, Lausanne, Neuchâtel, and Geneva), the advanced school [*Haute école*] of Saint Gall for the economic and social sciences, and the Federal institutes of technology. The diagram gives a simplified picture of the present situation.

3.2. Higher Education

3.2.1. *Universities*

The cantons are in charge of the universities except as regards the Federal institutes of technology. The organization of each university is regulated by a cantonal law which, however, fully guarantees the autonomy of the university. This autonomy is essentially understood to imply the competence to decide in an autonomous way on all points directly concerning knowledge.

All the cantonal universities are institutions under public law. The French-speaking universities and the *Haut école* of Saint Gall have their own legal personality, while the German universities as well as the two Federal institutes of technology are nonautonomous institutions. The universities have had quite different historical evolution and the diversity of their statutes reflects this. Nonetheless, an awareness of the laws of science and the principle of academic freedom and self-government are common to all Swiss universities. For all universities, except those of Basel and Zürich, self-government is expressly guaranteed by law. One essential element in university self-government is autonomy in statutory matters, i.e., the competence to proclaim internal legal norms such as regulations and ordinances within the domain of teaching and research (regulations concerning promotion, graduation, enrollment, and discipline).

Self-government also entails the authority to determine in detail the demand for education within the framework fixed by the state. The Swiss universities have no sovereignty in budgetary matters. The university budget is an integral part of the state budget, and the universities can participate to a certain degree in establishing a budget (chapter 9).

The supreme body encharged with questions concerning the university as a whole is composed everywhere of professors in all the faculties. At Basel it is called the *Regenz*, at Fribourg it is called the *Assemblée Plénière*, and in other universities it is called the *Sénat*.

The position of *recteur* [president] runs for one to four years in the universities. The *recteur* is assisted by a *prorector designatus* [vice-president] *(successeur)* and a *prorecteur (prédécesseur)*. The rectorates of the French-speaking universities are boards appointed for a relatively long duration (three to four years).

The assembly of the faculties is another university self-government body. The faculties, university subdivisions, have important tasks to accomplish, such as organizing teaching and examinations; they have the right to make proposals concerning the appointment of chairs and the right to grant titles of doctor. The faculty assembly is directed by the dean. The organization and assignment of duties at the faculty level is in principle the same in all universities. In addition to the faculties there are also a certain number of institutes that are linked more or less closely to the university.

Although the evolution in other countries has been in part different, the subdivision into faculties has been maintained in university laws that are currently in preparation. Only the *Haute école* of Saint Gall and the two Federal institutes of technology are broken down into divisions.

The necessary corollary to university self-government is state supervision, at least in the form of legal supervision. As the provider of funds, the state retains control of how financial means are used. The Parliaments decide on the necessary credits. While in the cantons of Bern, Geneva, and Vaud the university is not subordinated to any other authority, in the other cantons with universities special bodies have been set up between the executive and the university. Thus, in the cantons of Basel City and Zürich, there are two bodies between the government and the university: at Basel, the Council of Education and the *Curatel* and at Zürich the Council of Education and the University Commission, while at Fribourg there is the University Council and the consultant body of the State Council for university questions. Finally, the canton of Neuchâtel has set up a consultory commission for university education under the Department of Public Education.

3.2.2. *Libraries*

Each university and institute of technology has a central library which is often linked to the local or cantonal library. Further, each institute has its own specialized library accessible to enrolled students.

There is a lending system existing between the central Swiss university libraries and foreign countries, and through it students and researchers have access to the original or to a photocopy of publications in which they are interested. The interlibrary lending network is based on the Swiss collective catalogue, which is administered by the National Swiss Library; this is an inventory for all Swiss libraries that regularly announce their acquisitions. The exchange of publications with foreign countries is done through a centralized procedure (international exchange of publications) under the Central Library of the Parliament and the federal administration.

3.2.3. *Federal Institutes of Technology*

The Federal Institute of Technology of Zürich is subdivided into eleven technical divisions (see chapter 4) and one division for the human and social sciences. The latter are generally subdivided into institutes and laboratories. During the course of the last few years, four research units whose activity goes beyond the framework of the institutes have been created in the form of de-departments.

The Federal Institute of Technology of Lausanne comprises nine departments, consisting of institutes and laboratories (see chapter 4).

Because of their differing historical development, the two Federal institutes of technology also have different administrative structures. Because of the size of the undertaking, a new school administration was instituted at the Federal Institute of Technology of Zürich in 1973. It consists of a president, a *Recteur*, and an administrative director. The Federal Institute of Technology of Lausanne is administered by a president, and recently a vice-president has been added. At the Federal Institute of Technology of Zürich, there is a Conference of Professors and at the Lausanne Federal Institute of Technology there is a Council of Teachers and a General Council as participatory bodies.

The two Federal institutes of technology and the five research institutes of the Confederation, called *instituts annexes*, are under the jurisdiction of an administrative and coordinating body, namely, the Council of Federal Institutes of Technology. This in turn is subordinate to the Federal Council.

3.3. Non-university Tertiary Sector

The *higher technical schools [écoles techniques supérieures]* (ETS) are cantonal or regional educational institutions recognized and subsidized by the Confederation.

A permanent federal commission is encharged with ensuring that the needs of the Confederation in educational matters are met. At present, there are fifteen day schools and eight evening schools offering highly qualified technical training. Despite different courses of education, especially as concerns the duration of studies, the conditions for admission and the preliminary professional practice, as well as the educational objectives of the higher technical schools, are all uniform. The higher technical schools are subdivided into specialized department (see chapter 4).

The agricultural technical schools *[technicums]* or higher agricultural schools *[écoles supérieures d'agriculture]* under the jurisdiction of the cantons subsidized by the Confederation may be compared to the higher technical schools. Most are recognized by the Confederation as higher technical schools.

In addition there are a number of educational establishments for paramedical training, social work, commerce, transportation, administration, media, and information and communication, and for the artistic professions.

Most of the twenty-one schools of *social work* (social services, curative pedagogy, guidance, etc.) are supported by private or semiprivate associations. The nine schools of social service are supported by the Swiss Association of Social Service Schools [l'Association suisse des écoles de service social] (SASSA), which functions as a coordinating body.

For the nursing professions, education is provided in 105 education establishments (for example, nursing schools) which are generally attached to hospitals. These courses of study are associated with the Swiss Red Cross; however, there is a convention between the Swiss Red Cross and the cantons (May 20, 1976) concerning the allocation of tasks having to do with education of nursing personnel.

Education for the medical and technical professions (e.g., laboratory technicians) is also regulated and controlled by the Red Cross.

Medical-therapeutic professional training is under the supervision of the Swiss Society of Physicians; it is provided by professional schools which are generally attached to a hospital.

With the exception of the five *higher cantonal schools of economic and administration*, financed by the Confederation, namely, at Zürich, Lausanne, Olten, Basel, and Bern, the thirty-four schools providing education in commerce, tourism, transportation, and administration are private or semiprivate enterprises. As regards the training of translators and interpreters, there is a school associated with the university of Geneva, a semiprivate school at Zürich, and two private schools at Zürich and Montreux.

The conservatories (in collaboration with local universities), four schools of dramatic art, and eleven schools of arts and crafts provide a higher education in the *arts*.

The training of teachers is the responsibility of the cantons. The cantons regulate the conditions, structure of education, final examination, and eligibility. Teachers in professional schools and to a certain extent kindergarten teachers constitute an exception. Kindergarten teachers are educated in cantonal, community, or private institutions. The average age for entry into a teachers college is generally 17 or 18 years. Usually a dozen years of school and one period of practical training are required. The education takes two to three years.

In the majority of cantons, primary school teachers are trained in teachers training schools (in German Switzerland: *Lehrerseminar*).

Training in a teachers training school lasts four years, and at present five years in a number of cantons (it follows directly upon the mandatory school). Students are thus between 15 and 21 years. In some cantons, a *certificat de maturité* is required to pursue training as a teacher.

Secondary school teachers are specialized teachers in the branches of languages and history or mathematics and natural sciences. They obtain their education after having attended a school preparing them for the *maturité*, the school of pedagogy of the university, or one of the higher pedagogical institutes independent from the university. The education lasts three to four years (see Appendix 11, IV).

For teaching in a gymnasium a *doctorat* or a *licence* acquired in one of the two faculties of the human sciences is required. Then the candidate acquires a pedagogical and psychological education in the university or in special courses of one to two years organized by the canton. The gymnasium teacher normally teaches in two or three areas.

The training of teachers in special areas:

Drafting teachers obtain their education in a school of arts and crafts or in a school for drafting teachers. This training lasts eight to ten semesters depending on the preceding education.

The training of music and singing teachers is partly provided by conservatories and partly by the universities and lasts on the average four years.

The training of teachers of physical education is offered by the universities of Basel, Bern, Fribourg, Geneva, and Lausanne as well as by the Federal Institute of Technology of Zürich. The duration of studies is usually four semesters. *Teachers of manual arts and home economics* are trained in special schools. This training takes place after a corresponding professional apprenticeship or after a school providing a general education. The duration of this training is two to four years.

Specialized teachers acquire their specific education in a university institute of curative pedagogy (Basel, Geneva, Fribourg), in an appropriate private institution (Zürich), or in special courses organized by the canton.

Teachers in the *industry and crafts professional schools* pursue an education of four semesters at the Swiss Institute of Professional Pedagogy.

Teachers in the *commercial professional schools and the commercial diploma schools* are principally university graduates.

University professors are chosen from among researchers who have distinguished themselves with a doctoral work of high quality, who have continued their research activity, and who as a general rule have submitted a doctoral dissertation.

While *permanent education* has had to appeal to teachers at other school levels, one can believe, during the course of the past few years special courses of education have been created for teachers in charge of permanent education, in particular directors of youth centers and teachers for adults (for example, at the University of Zürich, the Academy for Adult Education, Lucerne).

4. THE EDUCATION AVAILABLE IN THE TERTIARY SECTOR

4.1. Universities

All universities have faculties of philosophy and letters, of natural sciences, of law, and of the economic and social sciences. The universities of Basel, Bern, Geneva, Lausanne, and Zürich have a faculty of medicine, while at Fribourg and Neuchâtel these courses of instruction are limited to propaedeutic sectors, at Fribourg to the second propaedeutic examination, and at Neuchâtel to the first examination. The universities of Bern and Zürick have a faculty of veterinary medicine. As regards faculties of theology, the conditions are very varied. Fribourg and the Faculty of Theology at Lucerne teach Roman Catholic theology, Bern teaches Evangelical and Catholic Christian theology, and the other universities teach Evangelical theology. The advanced school *[Haute école]* of Saint Gall specializes in the areas of economic sciences, administration, and the social sciences. It is composed of five divisions: business economics, public economics and economic sciences, law, technology and natural sciences, and history and languages.

According to the regulations, the *total duration of studies* up to the first academic diploma is six to eight semesters, and thirteen semesters for medicine. Nonetheless, the actual duration of studies is longer, according to the type of studies undertaken and the degree desired by the canton. In general the less regulated the course of instruction, the longer the course of study. These degrees and diplomas are of a purely academic nature and do not initially give the right to exercise a profesion. Thus doctors, pharmacists, chemists in the field of nutrition, lawyers, and teachers must undergo state examinations before being able to exercise their profession independently. In certain cases (medicine, for example) only Swiss citizens are permitted to pass these examinations.

Instruction in the universities and the Federal institute of technology is full-time instruction. For students who travel and who study part time, this therefore means a prolongation of their total duration of study.

4.2. Advanced Study, Recurrent Education

The *hautes écoles* offer for the most part two possibilities for *advanced study :* courses for non-enrolled students (auditors) and postgraduate study (third cycle). In addition, several universities organize advanced specialized courses most often for high-ranking personnel in the economy, engineers, and teachers at the secondary level, gymnasium, and university, as well as priests and pastors; these courses are principally for advanced study with an eye toward promotion or updating knowledge.

The five *haute écoles* of French-speaking Switzerland coordinate their postgraduate studies (third cycle) by means of conventions and by the instrument of joint scientific commissions.

The *Haute Ecole* for economic and social sciences of Saint Gall is the only one in Switzerland offering institutionalized courses of advanced study. It offers regularly five types of seminars, first and foremost, for managerial personnel in the economy and administration and for teachers in commercial schools (for example, the Saint Gall Management Model).

The Faculty of Psychology and Educational Sciences [La Faculté de psychologie et des sciences de l'education] (FPSE) of the University of Geneva has a structure that inclines toward recurrent education: it offers students the possibility of obtaining a certificate by bringing together "capitalizable units" which are equivalent to several periods of study.

Switzerland does not have an "Open University" nor *correspondence* university courses. Expericence abroad in this domain is currently the object of attentive observation. Private correspondence courses exist for languages and commercial branches.

4.3. Federal Institutes of Technology (EPF)

The Federal Institute of Technology of Zürich was founded in 1854 as an institution of higher learning for the technical sciences, industrial chemistry, and forestry, as well as for other branches that serve as a basis for education in these areas. Thus, from the beginning, mathematics, physics, natural sciences, and pharmacy were taught at the EPF. Later, instruction in agriculture and agronomy was added. Polytechnical instruction at present comprises the following divisions: architecture, construction, mechanical engineering, electronics, chemistry, pharmacy, forestry, agriculture, culturing techniques and measurements, mathematics and physics, and natural sciences (biology). Supplementary or optional courses may be pursued in the division of human and social sciences. The courses in gymnastics and sports lead to a diploma of *maître de sport* recognized by the Confederation and permitting the holder to teach this subject at all levels. The EPF at Zürich also has a division for military sciences for career officers. Since the beginning of the twentieth century scientific research has been the object of a special attention, and close collaboration between research

and instruction is fostered by the creation of numerous chairs and institutes. Since its founding, the EPF at Zürich has always sought to prepare its students for the needs of practice and for an independent scientific activity by providing them with a theoretical and practical education (seminars, laboratory work, study trips, etc.).

At the EPF at Zürich the normal course of education up to the obtaining of a diploma marking the completion of studies is eight to nine semesters. To this must be added the obligatory practical periods, which can last up to a year. With two to three supplementary years of study, the holders of a diploma can obtain the title of doctor of technical sciences, mathematics, or natural sciences. In addition to doctoral studies, the various divisions of the Zürich EPF also offer postgraduate studies which are designed to deepen knowledge in a specific area of studies in the discipline in which the student has his degree, to provide education in an area which was not studied during the degree studies, or to broaden knowledge in interdisciplinary studies.

The private school for civil and construction engineers founded in 1853 was incorporated into the University of Lausanne in 1869 under the name of *Polytechnicum*. In 1942, the School of Engineers was separated from the Faculty of Natural Sciences and to it was added a School of Architecture. In 1946, these schools merged to form the Polytechnical School of the University of Lausanne (EPUL). This was taken over in 1969 by the Confederation and became the second Federal Institute of Technology. The purpose of the school has undergone changes and development during the course of years. This school provides for instruction and applied and basic research, and in addition it carries out other important tasks in the service of the economy and the authorities.

The organization of the school allows for both a scientific and a practical education of the highest level. The study programs are obligatory, but the student may choose optional areas or a specialized course of study from the fifth semester onward. To obtain a diploma, the students of the two federal institutes of technology must undergo two preliminary examinations and a final examination. It is possible to transfer from one federal institute of technology to another.

The Federal Institute of Technology has nine departments: civil engineering, rural engineering and geometry, mechanics, electricity, physics, chemistry, mathematics, materials, and architecture.

In the light of the rapid progress of the natural sciences and technology, the school also organizes graduate studies for assistants, doctoral candidates, scientific workers, and other persons with degrees. It also collaborates in the graduate courses offered jointly by the French-speaking universities. In addition, the Federal institutes of technology participate in courses of professional advanced training for engineers and architects, organized by professional associations.

In addition to the doctor's degree, the Federal institutes of technology offer the possibility of *postgraduate studies* of an interdisciplinary nature leading to a specialized degree. In postdoctoral studies of land management *[aménage-*

ment du territoire], for example, students coming from the different discipline and faculties learn to structure difficult and chaotic situations in regional management.

4.4. Non-university Sector

The task of the *higher technical schools* (ETS) is to provide a qualified training for the exercise of higher technical professions. These schools teach their students scientific, technical, and practical knowledge complemented by exercise in construction and laboratory work. Considerable attention is also devoted to general education, good work methods, and character formation.

The programs of instruction of the higher technical schools meet international standards. The new Federal law on professional education thus defines the purpose of this formation as follows: "The Confederation encourages education in higher technical schools (engineering schools) which provide their students with the theoretical and practical knowledge necessary to the engineer, namely, mathematics, natural sciences, the engineering or construction sciences, civil engineering, or architecture, as well as areas of general culture, and train them to apply independently the results of their science and research to production and industrial development as well as other domains.

The condition for admission is the successful completion of an apprenticeship of three to four years in some technical branch. The higher technical schools provide instruction in the following areas: architecture, civil engineering, urbanism, rural engineering, geodesy and mechanical measurements, microtechnology, automobile technology, heating and air conditioning technology, chemistry, electronics, nuclear engineering, medical engineering, and graphic techniques. Education lasts three years; in the evening higher technical school it is four-and-a-half years. When the final examination is successfully completed, the student obtains a diploma of Technician and Engineer of a Higher Technical School, which is also recognized by the European Federation of National Engineering Associations. Pursuant to the Federal Law on professional education, the Confederation or the Federal Department of Public Economy can establish minimum prescriptions concerning the program of studies and examinations in the higher technical schools.

The holder of a higher technical school diploma must be able to develop existing projects, carry out the necessary evaluations and constructions, work out plans for implementation, and compile estimates. He supervises instruction and directs and controls laboratory study.

Numerous jobs are available to the graduates of a higher technical school, for example, building of machinery, of instruments, or of buildings, production manager, worker in charge of the study and introduction of new methods of production, worker in a research department when he or she participates in the practical implementation of knowledge acquired experimentally or theoretically, sales engineer for high technology equipment, division attaché in large enter-

prises where technical problems are dealt with, for example, organization, manufacture, the patent division, or equipment and personnel divisions.

Although instruction does not prepare for going on to a university, students of higher technical schools can be admitted under certain conditions to the institutes of technology and to certain faculties in the university to continue their studies.

The education offered is much more heterogeneous in the technical schools *[écoles de techniciens]* than in the higher technical schools. The *technicums* are closely linked to certain branches of the economy or to enterprises; they offer courses of studies linked to practice and lasting in general two years. To be admitted, one must be able to offer proof of practical experience and practical knowledge. The *écoles supérieures d'agriculture* are financed by the cantons, subsidized and recognized by the Confederation, and may be compared with the higher technical schools. The courses of education in these institutions, which are practically orientated and last six semesters, provide knowledge in matters having to do with agricultural and dairy economics, animal and plant production, arboriculture and viticulture, etc. Each school is specialized in one of these domains. The total number of students has increased during the course of the last five years; this may be attributed mainly to the attractiveness of the new course of instruction in landscape architecture. Persons with a diploma in a course of study close to this sector are the principal candidates for admission; holders of a *certificat de maturité* are admitted if they have had one or two years of practice to their credit.

The *écoles supérieures d'économie et d'administration* prepare commercial employees and public officials occupying skilled middle-level positions in the private economy or in public administration. The course of instruction given in these five day schools and one evening school lasts six semesters and leads to a diploma in business economics recognized by the Confederation.

Among the other professional schools we may mention the following: The *école de diplôme commercial*, which lasts in general three years, providing a basic commercial education and leading to a diploma equivalent to the *certificat de capacité* granted at the end of a professional apprenticeship. The *école des transports*, which often is under the same direction as the school of commerce, comprises two annual courses and prepares mainly for work in enterprises under the Confederation (the postal service, the railroad, the customs). Various schools of arts and crafts, such as apprenticeship workshops, metallurgy schools, schools specializing in textiles, schools of fine and applied arts, agriculture schools, and home economics schools prepare for the corresponding professions with a course of instruction lasting two to three years.

The education of a *social assistant* is concentrated on imparting the ability to help persons in difficulty, whether psychological, material, or administrative. The conditions of admission established by the "Swiss Study Group for Social Work Schools" (GESETS *[Groupement d'études suisse des écoles de travail social]*) for a basic education are the following: complete secondary school education with professional apprenticeship and experience. Full-time instruction

(three years), as well as a course of study parallel to the profession (four years of evening school) are sanctioned by a recognized cantonal diploma.

Social assistants acquire their university education for the most part in French-speaking Switzerland on the condition that they are holders of a *certificat de maturité*. The instruction given at Fribourg, Lausanne, and Neuchâtel also prepares for managerial functions in the social services and theacher activities in schools of social services, as well as for research and planning in the area of social services.

The education of a specialized *educateur (homes)* lasts two to three years and trains the student for jobs in education, assistance, and the management of homes. Persons holding a secondary school diploma and a proof of professional apprenticeship or secondary education and practical experience are admitted. Two out of eight schools provide both full-time and evening instruction (the evening courses are paralleled by work in the field). In addition, two social service schools provide training for the specialized *educateur (homes)* in specialized courses within the course of study in social services.

Training in health services comprises numerous branches; this area has courses of study which are closely linked to practice, but which are distinguished in terms of their responsibility, financing, and objectives.

The basic courses of study in the nursing professions provide knowledge and abilities in matters having to do with the general care of patients, psychiatric care, child care, and maternity. Training is provided in schools which are generally cantonal, sometimes private, according to the guidelines for education established by the Swiss Red Cross.

The duration is three years and includes theoretical instruction as well as practical activity in a hospital. It requires at least nine years of secondary school; in addition, the student must be 18 years or over. The Red Cross school of *cadres* for care to the ill offers training for teaching in hospital schools or for managerial functions in the hospital.

The courses of training grouped together under the name "*medical and therapeutic professional training*" educate for specialized functions: physiotherapy, ergotherapy, ortho-optics, dental hygiene, dietetic assistance, and radiology assistance. Their common point is that they all require a preliminary training in addition to mandatory secondary schooling. The course of instruction, which lasts two to three years, is provided in professional schools to which a hospital is generally associated or incorporated.

Training for *medical-technicalprofessions* requires ten years of schooling and lasts one to two years. The training of an academic technical assistant takes place in a short course of instruction, three to three-and-one-half years, including a practical period at the University of Basel.

5. CONDITIONS FOR ADMISSION TO HIGHER EDUCATION

5.1. Universities

Every holder of a Swiss *certificat de maturité* of type A, B, C, D, and E recognized by the Confederation (see chapter 3) may enroll in one of the institutes of technology or undertake medical studies without any preliminary examination. As a rule, he or she has access to any faculty of any university. Persons who have not had the opportunity to pursue the traditional gymnasium course, which leads to one or the other *certificat de maturité*, may prepare in a private school or an evening school (which exist in the large cities) for the Federal examinations of *maturité* organized by the Federal Commission of *Maturité* since 1888; thus they obtain a Federal *certificat de maturité*, which gives them access to the university.

A *bachelier* who has obtained a *cantonal certificat de maturité* may enter certain faculties or certain universities without another examination. The holders of a diploma of primary school instruction may have access to certain faculties if they take a complementary examination. Any other person who desires to enroll must undergo an *entry examination* which is organized by each faculty in a way judged by it appropriate.

At Geneva, the doors have been opened in certain faculties of the university to Swiss candidates without secondary school diplomas on the condition that they are at least twenty-five years old and have exercised a professional activity for at least three years or are able to provide proof of an equivalent activity. The aptitudes necessary will later be tested according to the procedures of each faculty. A selection is made during the course of the first semesters of study.

Most university courses are also open to auditors, i.e., persons who are not enrolled to obtain diplomas. The universities of Geneva, Neuchâtel, and Basel offer courses for the elderly (university for the tertiary age group). A *foreign* student with a diploma permitting him to undertake university studies in his own country may in principle obtain an equivalence which permits him to enroll

in a *haute école* without, however, the possibility of taking Federal medical examinations. The recognition of foreign secondary school certificates is a matter for each university to decide. Candidates whose certificate is not recognized as being equivalent to the Swiss *certificat de maturité* may undergo an admission examination, which takes place two times per year at Fribourg under the auspices of the Swiss universities. A sufficient knowledge of the official language of the courses of studies is a condition *sine qua non* of admission. In most universities candidates speaking a foreign native language must undergo a language examination. The Federal institutes of technology admit without examination only foreign candidates with a recognized certificate who have obtained excellent grades. In addition, an admission examination is in general required from foreign candidates. At *Ecole des Hautes Etudes* of Saint Gall, this is obligatory, for here the number of foreign students is limited to 25 percent of the total.

As regards admission we should also mention the problems of lodging at the universities: indeed, in medical studies the first signs have appeared of a danger of bottlenecks, first at the level of preclinical semesters, and later at the level of clinical training. In 1969 the Swiss university conference (see chapter 8) established a commission to study problems concerning medicine; this commission was encharged with organizing the campaign for *preliminary enrollements*. The purpose of this campaign was to avoid the adoption at a national level of restrictive admission conditions or to make it possible to differentiate the application of such measures as broadly as possible; to achieve this end it is necessary for the universities to know in good time the number of students who are going to begin their studies so that they may increase the number of study places by means of emergency measures. When the demand is too high for a given university, the students who cannot be admitted are transferred to another college or university which still has a reserve number of study places or which is also in the process of undertaking emergency measures. This system of pre-enrollment can of course only function as long as the demand for study places in all the Swiss universities does not exceed the number available. This was still the case for 1979—80.

After that year the situation deteriorated in other sectors of education as well. A proof of this is the fact that several universities have declared obligatory pre-enrollment for certain areas, and even for all.

5.2. **Federal Institutes of Technology (EPF)**

The Federal institutes of technology recognize the validity of foreign secondary school diplomas only if the holder has obtained very good grades. In general the candidate must undergo an admission examination. At the Federal Institute of Technology at Lausanne a course in special mathematics is mandatory for foreign students whose diploma is not deemed to be equivalent to the Swiss *certificat de maturité*.

5.3. Non-university Tertiary Sector

To be admitted to most of the higher technical schools (ETS) on a full-time basis, candidates must be in possession of a Federal certificate of professional ability *[certificat fédéral de capacité professionelle]*, a diploma testifying to the completion of apprenticeship, for the area chosen, and must have passed an entry competition test in mathematics, native language, and technical design. Preparatory courses for this competitive examination are often organized by the professional schools and trade schools. The final admissions are generally announced on the basis of the results obtained at the end of the first semester of study. The candidates who have attended a higher professional school have only to pass an abridged entry examination. The holders of a cantonal *baccalauréat* or a Federal *certificat de maturité* are admitted without examination if they have completed a practical period under supervision, lasting at least one year, in an enterprise or a technical office specializing in the area which the student has selected for study. In the evening higher technical schools, the *certificat de capacité professionelle* or an equivalent education in a branch related to that chosen by the student is required. In addition the candidate must provide proof of employment in this branch. As a rule, admission to the first semester takes place without an entry examination. Selection takes place during the course of instruction; the first semester of study is conditional.

The conditions for admission to the higher administrative schools *[Écoles Administratives Supérieures]* are similar: a *certificat de capacité* or commercial diploma and a practical experience period of two years.

Holders of certificates of primary education or a *certificat de maturité* have access to schools for secondary school teachers, first cycle. To enter an *école sociale* a candidate must have finished the gymnasium or a secondary school, first cycle, and an apprenticeship, as well as having had professional experience. The same applies in general to other sectors (see chapter 4); for paramedical study, a minimum age of 18 years is required for admission to the schools.

6. COMPLETION-OF-STUDY EXAMINATIONS AND DIPLOMAS

6.1. Higher Educational Institutes (Hautes écoles) *

The broad autonomy of Swiss colleges and universities and their faculties as regards the organization of study has given rise to a diversity in the types of organization and to a certain extent the types of university certificates. In principle, academic certificates and certificates of professional aptitude are distinguished.

A *university certificate* attests that its holder has a mastery over the subject matter and the methods of a field of knowledge and that he has given proof of this in a diploma examination at the end of a prescribed number of semesters. The conditions for obtaining academic diplomas as well as the preparation and organization of examinations are regulated by each university, the faculties, or the divisions. Despite the diversity of regulations, the requirements and the quality of the ten Swiss colleges and universities are equivalent. There is no one university that preponderates: each has its own privileged domains and has distinguished professors and researchers that account for its reputation.

There are three types of academic certificates and hence three academic titles: the license [licence], the diploma [diplôme], and the doctorate *[doctorat]*.

The *licence* is a certificate attesting that its holder has pursued a complete cycle of studies in a specific area of knowledge and has successfully passed the corresponding university examination. A student, having pursued at least eight semesters of studies in the principal branch and one or two secondary branches of his choice, who has attended the prescribed courses and seminars, has successfully completed admission examinations and intermediate examinations, and has done an academic work of quality is admitted to the examination for a *licence*. In general, in branches where there are fixed programs of study, the effective duration of studies differs very little from the prescribed duration; but even in the humanities, where great freedom is left to the organization of studies, a *licence* is generally obtained after four to five years of study.

* Cf. PULVER, U. *Prüfungen und Abschlüsse* (Examinations and Certificates). In: HAUPT Paul, ed., *Schweizer Studienführer 1977—78* (Swiss Study-guide), Bern, 1977, p. 98—103.

In certain branches, principally the technical ones and the natural sciences, colleges and universities give technical diplomas *[diplômes techniques]* as completion-of-study certificates, in addition to or in place of a *licence*, to students who have successfully completed their final examinations. These diplomas, the requirements for which correspond to those for a *licence*, are considered more particularly as certificates attesting that their holder has been trained to exercise a practical activity in his or her branch of study (for example, as a chemist or a biologist).

A *licence* or diploma with good grades is a condition for access to post-graduate studies leading to a *doctorat*. Promotion to the degree of doctor is achieved at the end of a work of academic research carried out independently and having an original quality (the thesis), as well as an examination. The topic of a thesis is determined in coordination with the professor who directs and follows the research work. The thesis must be published. The duration of studies leading to a doctorate is not regulated but depends on the chosen topic, the accessibility of sources of documents for consultation, laboratory experiences, and the individual method.

As a general rule, a thesis requires three to five years work. The three types of academic certificates mentioned do not directly confer a *professional aptitude [l'aptitude professionnelle]* and, moreover, not in all cases. Access to the independent legal and medical professions (for example, doctor, dentist, pharmacist, lawyer, notary) and the exercise of certain professions within public institutions (teacher, geometrist, pastor) are regulated by the state. Examinations for access to these professions take place in combination with a university diploma examination (for example, pastor) or at the end of such examination (for example, notary), and in addition to university studies in the strict sense require a practical apprenticeship of some duration. They are organized by the cantons in collaboration with the universities and the conditions of examination are laid down with the participation of employers of professional associations. Access to the medical professions is regulated by the Confederation (regulations for Federal medical examinations of December 22, 1964). Only Swiss citizens may take the state examination, which gives the right to exercise the profession of doctor in Switzerland. In place of this examination, foreigners undergo solely a technical examination in a medical faculty. Medical studies last twelve to thirteen semesters and end with the obtaining of Federal doctors' diplomas; then the graduate generally prepares a thesis. Before entering into independent professional activity, a physician goes through advanced training for some years as an assistant in a hospital or a university institute.

Pursuant to the Federal Constitution (Article 33 and Article 5 of the temporary provisions), the certificate of aptitude granted by one or several cantons authorizes its holder to exercise the corresponding scientific profession throughout the entire territory of the Confederation. The professional and academic certificates of all Swiss universities are thus in principle recognized in all the cantons. For the medical professions there is even a special Federal law regulating the freedom of establishment of medical personnel in Switzerland (December 19, 1877).

Because of the federalist structure of Switzerland, the Confederation does not have the authority to recognize for all of Switzerland the validity of *foreign* university diplomas. Only the university, the institutes of technology, and the faculties have the authority to adjudge the validity or the equivalence of a foreign certificate for the purpose of the pursuit of studies in Switzerland. But if the exercise of a profession is in question, this decision is a matter of the employer.

In accordance with Swiss jurisprudence, the protection of scientific *titles* is essentially a problem of cantonal law. At the Federal level, the use of professional designations and titles is regulated by the Federal law on competition as far as competitive rights are concerned. It generally sanctions the usage of professional designations and titles when there has been an act of dishonest competition, fraud, or deliberate pecuniary injury. Only a title acquired in a Swiss or foreign university on the completion of studies of a specific duration, and based on a certificate attesting to the education obtained, is considered in practice to be a title of doctor as far as competition is concerned. The *university statistics* provide the following picture of university examinations: in 1977 almost 5,000 students completed their studies and obtained a license or diploma, and about 1,600 obtained a doctorate; this number represents 12 percent of all students enrolled in 1977. As regards the 12,000 women enrolled in 1977, about 10 percent obtained an academic certificate.

The statistics on the number of students who left the university prematurely cannot be evaluated until after a few semesters when sufficient data are available (turnover statistics were introduced only in 1972—73). At present it is not possible to know exactly if a student abandons his studies for good, if he interrupts them only for a certain time, or if he has simply put off his examination. It is impossible to gather data on examination failures for the whole of Switzerland. An initial provisional analysis of the success or failure of studies among students enrolled for the first time in 1973—74 in medecine *(3)* shows, however, that of 1,300 students beginning in 1973—74, only 62 percent are still enrolled in medicine after eleven semesters (one year before the final examination), 10 percent have changed the faculty of study, and 15 percent left the university without having obtained a certificate.

A study of students of the entry year 1965 *(4)* shows that up until 1973 some 7 to 23 percent (depending upon the faculty) of students enrolled since 1965 left the university without a certificate, and 40 to 78 percent (according to the faculty) successfully completed the final examination. Most of the students who had not yet obtained a certificate after eight years of study were in the humanities, which are less structured.

6.2. Non-university Tertiary Sector

The students of nonuniversity institutions of higher learning finish their studies with a certificate of professional aptitude. They undergo diploma examinations after two to four years of study (see chapter 4).

In the higher technical schools (ETS) in 1978 about 1,400 students obtained the diploma of ETS engineer after three years of study. About 5,600 future engineers were studying in the higher technical schools in 1978. The failure figures are relatively high (in certain technicums and in certain branches 20 to 50 percent) owing to the increased demands and the admissions policies of the higher technical schools.

In the non-university *medical sector* the number of graduates has doubled in the course of the fifteen past years and today is more than 3,000 (1978: 3,200 for a total of 8,000 students pursuing an education of two to three years duration). In this sector, as in that of *social assistance* (about 2,000 students in 1978), access was limited for certain courses of study so that students were selected beforehand and not during the course of their studies.

At present we still do not have any Swiss statistics on examinations of the non-university sector: until we do we cannot provide any more detailed data on this topic.

7. THE STUDENTS

7.1. Higher Educational Institutes

During the last twenty years the number of students in Swiss higher educational institutes has more than tripled, while the population increased by about 30 percent during the same period. During the course of the last ten years alone, the number of students increased by more than 50 percent (see Table 1 in the Appendix). For the university year 1979—80, [a total of] 58,935 students were enrolled, almost 2.3 percent more than for the preceding year.

The proportion of students in the humanities (theology, law, economic and social sciences, and philosophy and literature) was about 50 percent (32,715 students) of the total number of students in 1979—80. The proportion of students in the natural sciences (medicine, philosophy II, technical sciences) increased to 44 percent (26,027 students) of the total number of students. It has therefore continued to decrease slightly in favor of the humanities.

Comparing the different courses of studies, we see an increase in the absolute number of students in medicine, while the increase during the last four years (1976—77 to 1979—80) was only 17 percent, as against 30 percent during the period 1966—69 and 1969—70. The proportion of students in medicine relative to the total number of students decreased slightly during these past years (1979—80: 50 percent).

In contrast, the number of students in the philosophical and historical faculties continued to increase (12 percent since 1974—75); their proportion relative to the total number of students was 20 percent for 1979—80.

While the number of students has diminished since 1972—73 in the economic and social sciences, enrollments in law have doubled during the past ten years. The number of students in the humanities also increased by 92 percent in the same period. Looking at the figures in detail we see that it is essentially the areas of ethnology (+514 percent) and psychology and pedagogy (+314 percent) which have increased the most rapidly; in linguistics, the greatest expansion has been in Slavic studies (+363 percent). English language and

literature also increased more than the mean, while the romance languages (+63 percent) and the Germanic languages (+21 percent) have diminished in popularity. In classical philology, the total number of students is 178, which is about the same today as ten years ago, the lowest level being achieved during the semester of 1971—72 with 109 students. The number of student engineers (in the Federal institutes of technology) increased little during the last decade (8 percent).

The recent increase in the number of students, broken down by discipline and in terms of all the colleges and universities, is indicated in Table 2 (Apepndix).

The proportion of *foreigners* relative to the total number of students is about 20 percent and has slightly decreased during the course of the past years. In 1979—80, some 10,930 students, or 19 percent, were foreigners. During the two last years, once again a higher number of foreign students among beginning students than among those already enrolled for some years was recorded. Some 60 percent of foreigners were enrolled in universities in French-speaking Switzerland. They came from neighboring countries, France, Italy, West Germany, Austria, Czechoslovakia, the United States, Latin America, and Asia. The proportion of *women* among Swiss university students has been growing slowly but steadily. At the end of the 1950s, only one student in six was a women, while today the proportion is 30 percent (see Tables 3 and 4 in the Appendix).

However, among foreign students, women have been traditionally better represented than among Swiss students: in 1979—80, their proportion was 36 percent, while they comprised only 30 percent of students of Swiss nationality. The female proportion in the Swiss universities in German-speaking Switzerland is clearly lower than that in French-speaking universities.

The women students are distributed quite unevenly among the different branches of study. They prefer the humanities and courses of study which prepare for pedagogical professions. On the other hand they have less interest in the technical, legal, and economic courses of study which have a direct link with a profession (see Table 5 in the Appendix).

The increase in the number of students has been matched by an increase in the number of university examinations passed by women. Young women made up 20 percent in the first and second examinations of 1971 and 25 percent in 1978. However, female students have a tendency to be content with a diploma for normal studies or basic studies, while male students more frequently enter into graduate studies. Although the success rate in the examinations is practically the same, the number of dropouts is almost double among female students, compared with male students. Since socioeconomic characteristics cannot be gleaned from university statistics, special studies must be carried out to determine them. *(5)* According to these surveys, the proportion of students coming from working-class backgrounds has increased slightly, while that of students coming from the middle classes has increased considerably during the

course of the last twenty years (T. Koch, op. cit., p. 218). A survey of the students in the 1965 crop, carried out in 1973 (H. Ries, op. cit.) yielded the findings in the accompanying table.

PROFESSION OF FATHER	
Worker	10.3%
White-collar worker	22.4%
Top-level management personnel	23.9%
Teacher, university instructor	17.6%
Independent	24.0%
Unknown	1.8%

7.1.1. *Lodging, leisure time*

Students must provide for their lodging themselves. Most live with their parents or as roomers, in private apartments or in student houses. Student housing is cared for by the canton or by a private foundation. Each university has a university restaurant offering meals at low prices. Students have the opportunity during their free time to visit the sport facilities of the university to participate in athletics, swimming, tennis, canoeing, sailing, etc. Religious, cultural, and political events are organized by the different student groups. All the universities have student orchestras, choirs, discussion groups, and meetings of all sorts. In each university there is an official student society whose functions and rights of participation are defined in the university law of the canton. The societies are brought together in the national union of Swiss students *[l'Union nationale des étudiants suisses]* (UNES).

7.2. Non-university Tertiary Sector

While the number of students in universities has increased by more than 50 percent during the past ten years, the number of students in higher technical schools decreased by 10 percent during the same period. The number of engineering students in Federal institutes of technology has scarcely increased during these past years.

During the phase of construction and development of the higher technical schools between 1956 and 1966 (new higher technical schools at Saint Imier, Basel-Muttenz, and Brugg-Windisch, as well as all the evening technicums, with the exception of that in Zürich, which was already in existence), the number of students in higher technical schools has more than doubled, growing from 3,274 to 7,768. Since then, the number of students in higher technical schools has decreased slightly but steadily, although in 1976 it was 6,679, which was

10 percent less than ten years previously. The decrease was particularly considerable in the evening technicums (less than 31 percent), which placed considerable demands on students, while the number of students in day technicums has remained practically at the same level. The development of secondary schools in gymnasia and the attraction of university education, on the one hand, and the development and creation of courses of study for *technicians* (at present more than 3,000 students in the nine day schools and ten evening schools), on the other hand, have perhaps contributed to this development.

About 4,000 future teachers are currently studying in the 120 *institutions for teacher training*. The slight decrease in the number of students may be explained by the current difficulties on the labour market.

8. THE TEACHING STAFF

The *structure* of the university teaching staff in Switzerland is largely determined by the classical conception of the university of Wilhelm von Humboldt. Essentially, the groups of teachers are the following: *Professeurs ordinaires*, *professeurs extraordinaires*, *professeurs honoraires*, *professeurs assistants*, *privat-docents*, course supervisors, and *lecteurs* (lecturers).

The *professeurs ordinaires* are one-third of the teaching body in number. Their position is important for most have a chair prescribed by law, and the structure of almost all the universities is based on these chairs. Almost all the *professeurs ordinaires* are full-time employees of the university. The position of *professeur extraordinaire* in the university is much less homogeneous than that of *professeur ordinaire*. The major difference rests, above all, in the degree of professional ties with the university: three-fifths are full-time employees. The title of *professeur honoraire* is given to deserving scientists. The institution of *professeur assistant* is a device whereby young university graduates may be given a teaching or research position. The title of *privat-docent* generally represents the first level of an academic career; appointment to the position of *privat-docent* presupposes a relatively major scientific research work and a thesis. As regards course supervisors and lecturers, these are almost exclusively part-time teachers.

University teachers are selected from among researchers who have completed a doctoral work of high quality, who have continued their research activity, and who as a general rule have presented a postdoctoral work of major value. The position of *professeur assistant* in the universities and the institutes of technology often presupposes a function of course supervisor or assistant for a certain time. The teaching body also includes *intermediary bodies*, i.e., assistants, work supervisors, and research supervisors. The assistants teach and at the same time are engaged in a personal research project. Swiss statistics on assistants will not be available until 1981.

University teachers are expected to carry out *research* in addition to teaching in their area of specialization. This commitment to research is in fact mentioned in the hiring contract of a teacher, but it is not regulated in detail. Freedom of instruction and research is guaranteed. Thus, it is incumbent on the teachers to carry out research on a specific problem and to publish its results.

The importance of *personnel policy problems* in the university has increased since the phase of personnel expansion was followed in 1974—75 by a phase of stabilization. Financial restrictions were above all at the root of the latter. While expansion brought about a lowering of the average age of teachers, stabilization had the reverse effect. In addition to the problem of an increase in the average age of teachers, there is also the problem of a more and more unfavorable teacher-pupil ratio owing to the increase in the number of students.

The number of full-time and part-time teaching personnel increased by about 48 percent between 1970—71 and 1979—80, going from 3,900 (including 182 teachers) to 5,780 (including 398 teachers). A comparison with the growth rates of the number of students indicates that the teaching body has increased in the same proportion as the number of students throughout all of Switzerland. The teacher-student ratio varies from branch to branch and university to university. In 1975—76 for all of Switzerland it was 23:1 full-time teachers and 18:1 part-time teachers.

Table 6 (in the Appendix) shows the expansion of the teaching body after 1967—68. As regards full-time teachers, there were practically no new entries from 1974—75 onward; in 1975—76, teachers between the ages of 40 and 49 were the most strongly represented, while during the preceding years it was teachers between the ages of 35 and 39 (the major part of new entries belonged to this age group). In addition, the number of part-time teachers reached a peak in 1975—76.

The average age of full-time teachers in all universities decreased between 1967—68 and 1974—75 from 49 to 46 years, while among part-time teachers it decreased from 48 to 44.5. Thereafter the average age again increased slightly (see Table 7 in the Appendix).

Advanced study of university teachers has to a large extent been left to their own initiative. Professional associations (as, for example, medical doctors) organize advanced training courses. A paid leave of absence (sabbatical leave) has not yet been institutionalized in all the universities. The efforts undertaker by the Institute of Technology of Lausanne should be mentioned: this school has a chair of university teaching, up until now the only one of its kind in Switzerland.

The pay of university personnel is fixed by each canton; therefore, there are differences from one university to another. As a general rule, assistants with doctor degrees earn about 35,000 francs per year, *professeurs extraordinaires* 60,000 francs per year, and *professeurs ordinaires* 80,000 francs minimum.

9. ADMINISTRATION AND FINANCING OF HIGHER EDUCATION

9.1. Administration

Swiss universities are cantonal institutions subordinated financially and administratively to the Department of Public Education of their canton. The two institutes of technology are subordinated to the Confederation, which finances them entirely.

According to Article 27, first paragraph, of the Federal Constitution, the Confederation can, in addition to institutes of technology, create or subsidize universities and other institutions of higher learning. While the idea of a Federal university has undergone almost no progress since 1874, there have been a number of efforts toward a general and permanent financing of cantonal universities.

The considerable increase in university costs during the 1960s made financial support of cantonal universities by the Confederation indispensable. On June 28, 1968, the Federal Law on university aid was promulgated; in this law, the Confederation made the coordination of teaching and research a condition for its financial support.

> The Confederation encourages the extension and growth of cantonal universities. It favours collaboration between all the colleges and universities in the country as well as coordination in teaching and research. To accomplish this, it gives subsidies. These consist of annual contributions to the running costs of universities (basic subsidies) and subsidies for capital investments.

The question of co-operation and coordination between universities has often been the subject of discussion since the beginning of the 1960s, since the activity and the growth of the universities cannot continue without restriction in a small state whose resources in personnel and financial needs are limited. Thus, optimal scientific results must be achieved through the judicial and rational use of the means available.

The *law on university aid [la Loi sur l'aide aux universités]* (LAU) is essentially a law to encourage and subsidize while at the same time safeguarding unimpaired the sovereignty of the cantons within the area of higher education. There is no Federal Ministry of Education, but, when the LAU entered into force in 1968, the Federal Department of the Interior created the Federal Office of Education and Science. The task of this office is to implement the LAU and, in addition, to deal with fundamental questions concerning education and research, in particular the problems of the *certificat de maturité* (see chapter 3), the encouragement of relief of cantonal costs for study scholarships by means of subsidies, and nuclear research and research in the area of energy; in addition it represents Switzerland in numerous international scientific organizations.

From the very beginning it was evident that Federal aid to the universities could not be left solely to the concern of the political and administrative authorities. The fact that decisions in such a complex and expensive domain require a particularly deep-going preparation was taken into consideration in the draft bill, which provided for a cooperation among bodies that were principally of an advisory nature. The Swiss University Conference was created under the LAU to effectuate a collaboration between the Confederation and the cantons in higher education. In addition to its task as a coordinating body, it carries out diverse consultative functions as regards the execution of the law.

As regards the tasks incumbent on the Swiss Council of Science, created in 1965 as the supreme advisory organ of the Confederation for questions of scientific policy, these are of a more general nature. The treatment of university problems and the formulation of a conception of a Swiss university policy of course represent only one part of its multiple activities. The LAU stipulates that this council must take part in university aid.

These two bodies are of equal status. The diversity of their composition and their functional organization nonetheless permits a judicious distribution of tasks. It is the task of the Council of Science to establish guidelines, while the University Conference has more of a practical executive function. The Council of Science works out a conception for scientific and university policy and formulates principles and rules in this area. As for the University Conference, it is the body which brings the cantons (which are responsible for the universities) together for the purpose of cooperation in dealing with problems of coordination, exchange of opinion concerning matters of joint interest, and consultation with regard to the tasks that are incumbent on them under the stipulations of the law.

9.2. Financing

The total operating and investment expenses for the universities and Federal institutes of technology are currently 1.6 billion francs (1977); relative to the gross social product of Switzerland, this figure has thus doubled during the past ten years (from 0.5 percent in 1965 to 1.05 percent in 1977). The overall share of university expenses in total expenses in the public sector is about 4 percent today.

University cantons finance about a half while the Confederation (including the Federal institutes of technology) finances 40 percent of university expenses. The rest is covered by the contributions of the community (2 percent) and by earnings from use.

During the course of the last ten years, the portion of university expenses financed by the Confederation has increased steadily (see accompanying table). *(6)*

1966		1975
9.0%	Earning from use	5.2%
0.7%	Communities	2.0%
59.1%	Cantons	51.5%
31.3%	Confederation	41.16%

If in addition to the financing of the Federal institutes of technology and subsidies to the cantonal universities one also takes into account Federal subsidies to the Swiss National Fund for Scientific Research as well as to several scientific societies, the Confederation covers about 56 percent of *university and research expenses*, while the cantons cover 44 percent. (7)

As regards professional education, 43 percent of the costs are absorbed by the cantons, 37 percent by the communes, and 22 percent by the Confederation. (8)

We do not have overall statistics concerning expenses and their change in the area of *parauniversity education*, since these institutions are only partly financed by the state.

9.3. Scholarships

Scholarships and loans are allotted by the cantons, the communes, private organizations, and the Confederation. Each canton has its own scholarship system. Since the "Federal Law on the Allocation of Subsidies for Cantonal Expenditures on Study Scholarship" of March 19, 1965, and the ordinance of July 9, 1965, entered into force, legislation concerning scholarships was revised in all the cantons. The Confederation subsidizes these scholarships granted by the cantons, the communities, and private institutions to university and non-university studies to the amount of 30, 40, or 50 percent according to the financial capacities of the cantons.

In these last few years, contributions of the public sector to the financing of education have increased considerably. In 1971 the cantons granted 100 million francs for scholarships, of which 40 million were provided by the Confederation. In the same year, loans were 20 million francs. In 1978, the total money given out was 150 million for the loans. Federal subsidies were about 55 million francs. *(9)*

The cantonal study scholarship services compile, as requested by the Confederation, an annual report on the scholarships granted in their canton. The Confederation then reimburses the sum of the subsidy. In addition the Confederation gives scholarships directly to students of the Federal institutes of technology, notably for postgraduate studies to foreign students living in Switzerland, as well as in some other cases.

Differences, sometime considerable, among the cantonal regulations in this domain derive from a real political, economic, and social diversity. Efforts have been undertaken, if not to unify, at least to coordinate the cantonal regulations on study scholarships.

Scholarships are allotted for the entire normal duration of studies, i.e., up to the license or diploma in university studies, and up to the completion of study certificate in extrauniversity studies. As a general rule, the grants are discontinued if examinations are failed. For postgraduate studies, particularly for the writing of a thesis, new sources of financing must be sought; ordinarily, the Swiss National Fund for Scientific Research gives subsidies for high-quality research projects (chapter 9.4).

9.4. Encouragement of Research

In Swiss colleges and universities, teaching is closely linked to research (see chapter 2, section 2.1). Professors have a duty not only to teach, but also to do research in their specialty (see chapter 8). Basic research is generally carried out in the institutes of colleges and universities. So far no special research centers have been created like the Max Planck Institute in West Germany, nor have professors been brought into pure research to safeguard the unity of instruction and research in the universities.

The infrastructure of university research is financed by the cantons (with Confederation subsidies) for cantonal universities, and by the Confederation for the institutes of technology. As regards research projects, they are also financed by the groups in charge of colleges and universities, and in the case of projects of superior quality by the *Swiss National Fund for Scientific Research.*

The Swiss National Fund is a private foundation; it was created in 1952 to encourage scientific research in Switzerland when financial means from other sources is not sufficient and when research is not for commercial purposes. The National Fund is financed to 99 percent by the Confederation; the Federal subsidies represent an annual sum of 140 million francs. More than 85 percent is for subsidies for research, 7 percent is for encouraging scientific activity (scholarships), and the rest is used as subsidies for scientific publications and for advanced scientific studies. Almost 45 percent on the average of subsidies goes to medicine and biology, 35 percent to the natural sciences, and 20 percent to the humanities.

Five research institutes (affiliated institutes) are linked to the two Federal institutes of technology; they devote their activities mainly to applied research and to scientific services in specialized areas (research on reactors, forestry, pro-

tection of the waters, nuclear research, tests of materials). The portion of funds devoted to research varies from one institute to the other with an average being 70 percent (total budget for 1978: 130 million francs).

If one takes into account all the contributions from third parties (subsidies from the National Fund, contributions from the private economy for university institute services, etc.), the amount of expenditures for research and development is about one-third *(10)* of total university expenditures (1978: total university expenditures 1,658 million francs — see Appendix: Tables 8, 9, and 10). Encouragement of research by the Confederation is based on Article 27 of the Constitution: a law on research is currently in preparation for the purpose of coordinating financial measures taken by the Confederation to promote research.

It should be mentioned that the contribution of the Swiss private economy to research is very large. In 1975, it financed almost 75 percent of research and development in Switzerland while the public authorities (Confederations, cantons, including the subsidies from the National Fund and Federal aid to universities) financed 25 percent (see Tables 8, 9, and 10 in the Appendix).

10. FUTURE EVOLUTION OF HIGHER EDUCATION

During the course of the years to come, higher education, especially university education, will encounter new quantitative difficulties as well as new qualitative needs.

10.1. Quantitative Development

The quantitative difficulties come from an increase in the demand for study places and the financial difficulties of university cantons and the Confederation. In the university domain, we can expect an increase in the number of candidates for studies up to the middle of the 1980s as a result of the high birthrate in the 1950s and 1960s. This is very clearly indicated in the provisions established by the Swiss Council for Science for its third report on the development of Swiss universities (see accompanying table).

One can on this basis make the above estimation for the number of beginning students (Swiss and foreign) in Swiss universities during the years to come. *(11)* (See accompanying figure.)

The Swiss education policy remains based as always on the principle of free access to university for all qualified candidates. A *numerus clausus* in cantonal universities would have negative effects on the other areas of education (snowball effect) and the cohorts of high-birthrate years would be disadvantaged compared with the preceding and following generations. Moreover, it could happen that the university cantons would first eliminate candidates coming from non-university cantons.

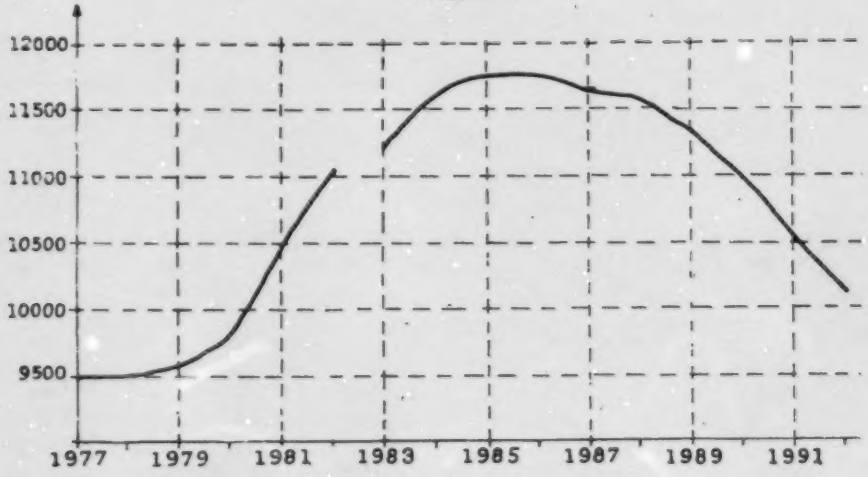
Henceforth, the authorities and bodies encharged with Swiss university policy will do everything to safeguard the guarantee of freedom of education and free choice of studies for all persons with the required qualifications.

Number of CERTIFICATS DE MATURITÉ giving access to university studies
(for comparison see Table 3 of the Appendix)

Previous evolution		Forecasts	
1972	6,367	1983	11,022
1973	7,292	1984	11,521
1974	7,852	1985	11,379
1975	7,868	1986	11,257
1976	8,643	1987	10,979
1977	8,961	1988	10,865
1978	9,373	1989	10,473
1979	9,762		
1980	10,374		
1981	11,097		
1982	11,665		

Figure 1

Freshmen. Statistical Forecasts



Source: Planning Service, Federal Office for Education and Science, 1983

BEST COPY AVAILABLE

The question of the growth of costs and financing in the future for universities is here of prime importance. Aside from the large financial contribution of university cantons (chapter 9), the Confederation currently supports on the whole almost half of Swiss university expenses (Federal institutes of technology, university aid, National Fund). The major portion of expenditures for students coming from non-university cantons who are enrolled in canton universities is covered by the university cantons. During the course of these last few years, the university cantons have clearly demonstrated that they were henceforth neither able nor willing to increase their expenditures for students coming from cantons without a university. This is the reason that an intercantonal convention on university contributions from cantons without universities is currently in preparation. It is provided that each canton should pay a determined sum for each of its students in a university canton. This solution should favor a certain intercantonal compensation. In turn, university cantons should undertake not to take measures restricting admissions for students coming from outside their canton. In their capacity of Federal institutions, the Federal institutes of technology would of course be excluded from this regulation.

10.2. Qualitative Development

The present conditions require reexamination and, if necessary, a redefinition of the education offered as well as of the goals and the *quality* of every education. Since the development of Switzerland depends in large measure on the quality of the university terrain, maintenance and improvement of the level of university education is one of the goals of current educational policy.

Progress in this domain requires not only the utilization of the accumulated financial resources, but also the good will of all those interested in a genuine study reform. We must go beyound the simple transmission of knowledge to active study, to a strengthening of the ties between academic studies and practice, and to attaching all due importance to general education alongside specialization (see chapter 2), but also to effecting an ongoing evaluation of instruction and study and to seeing that the youngest students are assisted by the older ones (tutor system).

Despite the considerable influx of students into the universities and the extra burden this entails for teachers, we must see to it that research is maintained and continues to develop (see chapter 2, and chapter 9, section 9.4).

A university education that proposes to meet the new demands of the society, the state, the environment, and the economy must endow the individual with the abilities needed to maintain his bearings in a professional world, public and private, in perpetual change, and to update continually his knowledge and knowhow. In the future, education will give more weight to experience in dealing with problems, the practical application of knowledge, and the mastery of methods. After having achieved his basic education, the individual has the possibility throughout his life of further advanced training in accordance with his professional or non-

professional needs. Permanent education and advanced studies of university graduates, as well as general adult education, will become one of the principle tasks of the university.

The development of the universities must be seen increasingly from the perspective of the development of the educational system as a whole, for a society must necessarily have a sufficient number of well-educated persons in the multiple domains where things must be done. The development of the tertiary and non-university sector and the creation of courses of study with new profiles take on a particular importance here. A greater movement between the different courses of studies is desirable, both at the institutional as well as at the organizational level (for example, transfer from higher technical schools to the university, access to higher technical schools for holders of the *certificat de maturité* with a practical period, access to the university without a *certificat de maturité*, etc.). However, the federalist structure of Switzerland gives rise to special problems as regards the introduction of the innovations mentioned, for such innovations must be realized within a broader framework and must not entail too high financial burdens for those involved.

11. INTERNATIONAL RELATIONS IN HIGHER EDUCATION

Switzerland is a member of numerous international organizations, including Unesco, the International Bureau of Education (located at Geneva), the Council of Europe, and the OECD [Organization for Economic Cooperation and Development]; it participates actively in their programs and their research projects.

In Unesco, Switzerland is involved in the work of the divisions "Planning and Financing" and "Programs, Structures, and Methods" of the educational system, as well as in "Higher Education." It actively supports the work of the European Centre for Higher Education (CEPES). It has co-operated in working out an international classification for education (ISCED) and has used this classification as much as possible as a basic for its own university and school statistics.

Since its joining the Council of Cultural Cooperation *[Conseil de la coopération culturelle]* of the Council of Europe (CCC, presently CDCC), Switzerland has taken part in the work of commissions concerned with problems of education and culture as well as pedagogical documentation and educational research. It participates in the Committee for Higher Education and Research, especially in projects concerning diversification in the tertiary sector of education and concerning the mobility of teaching and research personnel. Because of its federalist structure and the autonomy of its universities, Switzerland has so far not signed the conventions concerning recognition of studies and foreign diplomas. On the other hand, it grants six scholarships each year to students from the member nations of the Council of Europe. In addition it participates in the EUDISED project (European Documentation and Information System for Education), which like the American ERIC system (Educational Resources Information Center) aims at linking European services together in this area.

In the OECD, Switzerland participates in the projects of the Center for Research and Innovation in Education (CERI). The Office of Education and Science of the Federal Department of the Interior, and most universities, participate in decentralized projects as part of the program for "the administration of

institutions of higher learning" (IMHE). Several events, including certain training sessions in university planning and orientation, were organized at Zürich and Geneva. Experts of the OECD in 1971 undertook an initial examination of Swiss policy for science; an examination of the Swiss educational system is also envisaged. In 1978, a special study was devoted to the Swiss Institute of Pedagogical Research and Documentation (IRDP).

There are other international and bilateral relations at the university level or between researchers themselves. We should also mention the collaboration in private international organizations such as associations of teachers and research institutes that deal with problems of education, social systems, and advanced studies. Because of its linguistic pluralism, Switzerland often plays a linking role in this area.

LIST OF APPENDICES

Table 1 : Evolution 1970/78 of the Number of University Teachers (A), of the Resident Population between the Ages of 20 and 24 (B), College Graduates (C), and of the Number of Students (D) in Switzerland

Table 2 : Students in Winter semester, by Field of Study and by Sex

Table 3 : Evolution of Number of Students

Table 4 : Proportion of Women in University Education

Table 5 : Distribution of Men and Women in the Different Fields of University Studies, 1984

Table 6 : Full-Time Teachers 1983

Table 7 : Pyramid of Ages of the Teaching Profession, 1983

Table 8 : Expenditures on Research and Development, Broken Down by Sources of Funding, 1975

Table 9 : Research and Development Expenditures, According to Groupes of Disciplines, 1975

Table 10 : Research and Development Expenditures in Relation to the Number of Teachers, 1975

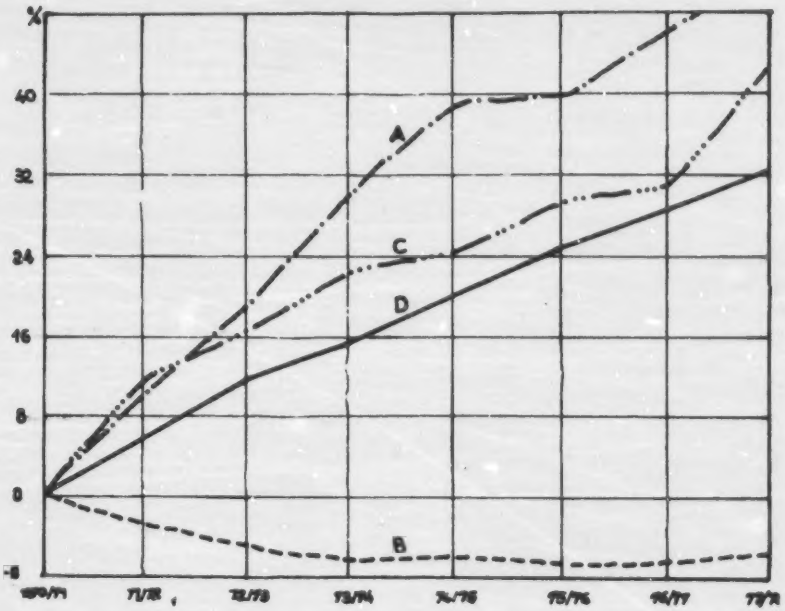
Appendix 11 : Examples of Curricula
- I Law
- II Economic Sciences
- III Engineer-chemist
- IV Pedagogical Training for Secondary School Teachers
- V Postgraduate Studies:
  - — Land Management
  - — Scientific Foundations for Air Protection

Appendix 12 : Addresses of Institutions of Higher Education

APPENDIX

Table 1

Evolution 1970—71 to 1977—78 of the Number of University Teachers (A), of the Resident Population between the Ages of 20 and 24 (B), College Graduates (C), and of the Number of Students (D), in Switzerland



Source: Federal Office of Statistics, Bern, 1977.

BEST COPY AVAILABLE

Table 2

Students in winter semester, by field of study and by sex

		• 1.0	1.1	1.2	1.3	1.4	1.5	1.6	2.0	2.1	2.2	3	4	TOTAL
1974/75	T	2228	976	5442	2022	3294	7058	5355	1930	2708	3851	9216	6583	50663
	M/H	1250	801	2507	1214	1552	5947	4179	1555	2430	2898	6900	6177	37410
	F	978	175	2935	808	1742	1111	1176	375	278	953	2316	406	13253
1975/76	T	2482	1037	5571	2162	3545	6991	5982	2077	2810	4126	9397	6442	52622
	M/H	1465	851	2540	1296	1594	5862	4609	1703	2509	3155	6901	6050	38535
	F	1017	186	3031	866	1951	1129	1373	374	301	971	2496	392	14087
1976/77	T	2183	1089	5891	2349	4030	6897	6431	2019	2837	4427	9712	6331	54196
	M/H	1316	884	2588	1361	1812	5722	4954	1632	2519	3382	6969	5935	39074
	F	867	205	3303	988	2218	1175	1477	387	318	1045	2743	396	15122
1977/78	T	2150	1153	6334	2518	4260	7074	6860	1979	2913	4551	9817	6291	55900
	M/H	1270	924	2747	1439	1881	5807	5192	1572	2581	3471	6869	5878	39631
	F	880	229	3587	1079	2379	1267	1668	407	332	1080	2948	413	16269
1978/79	T	2035	1212	6832	2869	4296	7006	7233	1736	2744	5075	9999	6574	57611
	M/H	1102	952	2906	1615	1897	5769	5444	1394	2406	3886	6869	6122	40362
	F	933	260	3926	1254	2399	1237	1789	342	338	1189	3130	452	17249
1979/80	T	2083	1271	7128	3158	4513	7218	7344	1905	2631	5110	10128	6465	58954
	M/H	1094	967	2997	1737	1925	5826	5416	1544	2305	3836	6834	5983	40464
	F	989	304	4131	1421	2588	1392	1928	361	326	1274	3294	482	18490
1980/81	T	2085	1438	7625	3428	4772	7413	7574	1931	2685	5383	10263	6777	61374
	M/H	1048	1080	3146	1873	1969	5898	5540	1578	2357	4000	6756	6216	41461
	F	1037	358	4479	1555	2803	1515	2034	353	328	1383	3507	561	19913
1981/82	T	2095	1540	8238	3672	4938	7799	7852	1476	3141	5807	10539	6802	63899
	M/H	1054	1140	3354	1993	1987	6090	5655	1146	2783	4298	6805	6166	42471
	F	1041	400	4884	1679	2951	1709	2197	330	358	1509	3734	636	21428
1982/83	T	2062	1603	8505	3956	5125	8061	8270	1423	3400	5949	10718	7134	66206
	M/H	990	1146	3406	2131	2002	6252	5855	1080	3027	4368	6791	6396	43444
	F	1072	457	5099	1825	3123	1809	2415	343	373	1581	3927	738	22762
1983/84	T	2046	1668	8982	4209	5298	8898	8827	1551	3799	6201	10805	7555	69839
	M/H	967	1164	3513	2225	2054	6826	6112	1149	3383	4544	6736	6682	45355
	F	1079	504	5469	1984	3244	2072	2715	402	416	1657	4069	873	24484

• Fields of study:
1.0 = Humanities
1.1 = Theology
1.2 = Philosophy, philology
1.3 = Historical sciences
1.4 = Psychology
1.5 = Economics
1.6 = Law
2.0 = Natural sciences
2.1 = Exact sciences
2.2 = Chemistry, biology
3 = Medicine
4 = Technology

F = Women
M/H = Men
T = Total

Source : BFS-SHIS/OFS-SIUS 1984

BEST COPY AVAILABLE

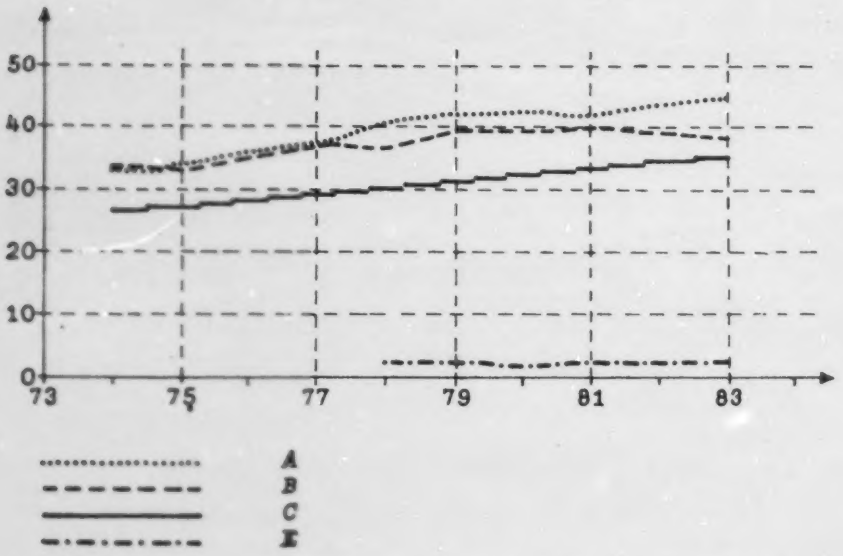
Table 3

Evolution of number of students

	STATISTICS			PROJECTIONS										
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Index 1992 (1982 = 100)
ZÜRICH	14786	15452	15801	16200	16500	16800	17000	17200	17300	17300	17300	17200	17000	108
BERN	7601	7808	7780	7900	8100	8200	8300	8400	8500	8500	8500	8500	8400	108
FRIBOURG	4110	4518	4704	4800	4800	4900	5000	5000	5000	5000	5000	4900	4900	103
BASEL	5714	6030	6303	6500	6700	6800	6900	7000	7000	7000	6900	6700	6600	104
ST. GALLEN (HSG)	1949	2008	2088	2200	2200	2300	2300	2400	2400	2400	2400	2300	2300	110
LAUSANNE	5493	5708	5819	5900	6100	6200	6300	6400	6500	6500	6500	6400	6300	109
NEUCHATEL	1928	1984	2051	2100	2200	2200	2300	2300	2300	2300	2300	2300	2300	111
GENEVE	9489	9860	10545	11000	11400	11800	12100	12300	12500	12600	12700	12800	12800	121
ETHZ	7388	7556	7983	8200	8500	8800	9000	9100	9200	9300	9200	9100	9000	112
EPFL	2157	2316	2478	2700	2800	3000	3100	3200	3300	3400	3400	3400	3400	138
Law	7404	7640	8010	8200	8500	8700	8900	9000	9100	9200	9100	9100	9000	112
Economics	7570	7911	8312	8600	8900	9200	9400	9500	9600	9600	9600	9600	9500	114
Philosophy	17217	18172	18777	19400	19900	20400	20800	21100	21300	21400	21400	21300	21100	112
Medicine	8818	9085	9209	9300	9500	9600	9700	9800	9800	9800	9800	9700	9600	104
Philology	10825	10830	11043	11200	11400	11500	11600	11700	11700	11700	11700	11600	11400	104
Engineering	6361	6792	7370	7800	8200	8700	9000	9200	9400	9500	9600	9500	9400	128
Canton Total	51070	53368	55091	56500	58100	59200	60200	60900	61400	61500	61500	61200	60500	110
Swiss Total	60615	63240	65552	67400	69400	71000	72300	73200	73900	74200	74100	73700	72900	111

Table 4

Proportion of Women in University Education



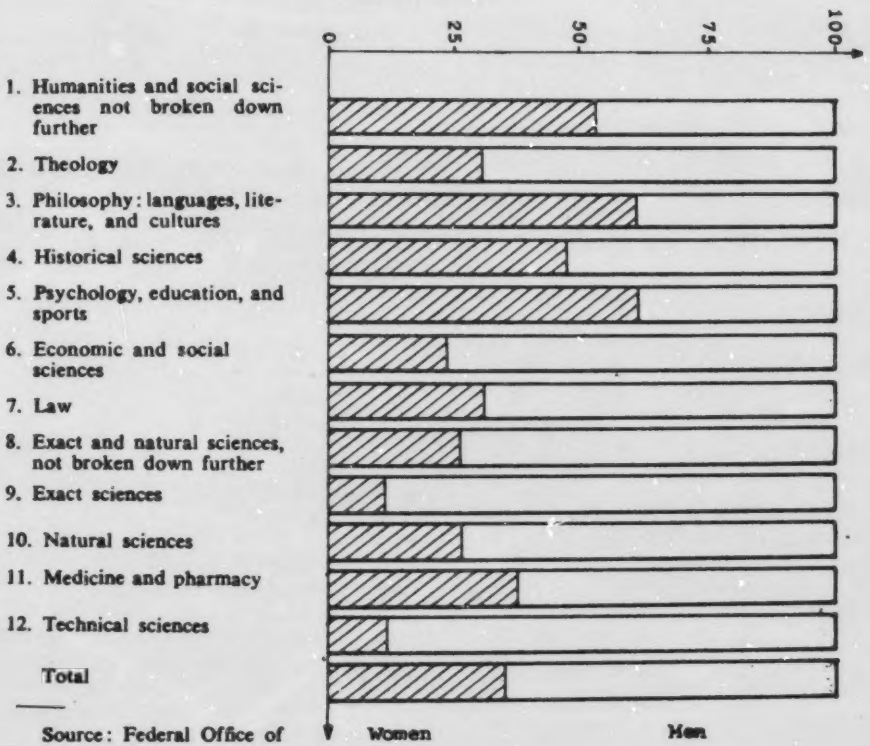
A — Women with a *certificat de maturité*.
B — Beginning students (Swiss).
C — Female students (Swiss).
D — Women with a final university *licence* or diploma.
E — University teachers (excluding assistants).

Source: Federal Office of Statistics, Sector of University Statistics 1984.

BEST COPY AVAILABLE

Table 5

Distribution of Men and Women in the Different Fields of University Studies 1984



Source: Federal Office of Statistics, 1984

BEST COPY AVAILABLE

Table 6

Full-Time Teachers 1983

		BASEL	BERN	FRIBOURG	GENEVE	LAUSANNE	TH. FAK. LUZERN	NEUCHATEL	ST. GALLEN	ZÜRICH	EPF LAUSANNE	ETA ZURICH	TOTAL		
0 Administrtion	T	.	2	.	.	.	.	.	.	.	.	.	2	T	0 ADMINISTRATION
	S	.	2	.	.	.	.	.	.	.	.	.	2	S	
	A	.	.	.	.	.	.	.	.	.	.	.	.	E	
1.0 Humanities	T	.	.	.	3	.	.	.	.	.	.	2	5	T	1.0 SCIENCES HUM.
	S	.	.	.	3	.	.	.	.	.	.	1	4	S	ET SOCIALES
	A	.	.	.	.	.	.	.	.	.	.	1	1	E	NON REPARTISSABLES
1.1 Theology	T	8	12	21	7	12	15	6	.	12	.	.	93	T	1.1 THEOLOGIE
	S	7	8	11	7	12	11	5	.	7	.	.	68	S	
	A	1	4	10	.	.	4	1	.	5	.	.	25	E	
1.2 Philosophy; Philology	T	30	23	19	38	35	.	22	7	44	.	5	223	T	1.2 PHILOSOPHIE;
	S	21	17	8	11	24	.	19	7	29	.	2	138	S	LANGUES, LITTERAT.
	A	9	6	11	27	11	.	3	.	15	.	3	85	E	ET CULTURES
1.3 Historical sciences	T	23	15	11	13	14	.	7	1	24	.	4	112	T	1.3 SCIENCES
	S	18	10	7	11	11	.	6	1	19	.	3	86	S	HISTORIQUES
	A	5	5	4	2	3	.	1	.	5	.	1	26	E	
1.4 Psychology	T	2	17	12	25	8	.	5	2	12	1	4	88	T	1.4 PSYCHOLOGIE,
	S	2	14	10	13	6	.	4	2	7	1	3	62	S	SC. DE L'EDUCATION
	A	.	3	2	12	2	.	1	.	5	.	1	26	E	ET SPORT
1.5 Economics	T	13	17	19	35	45	.	10	30	26	1	6	202	T	1.5 SCIENCES
	S	10	12	11	22	37	.	9	24	19	1	6	151	S	ECONOMIQUES ET
	A	3	5	8	13	8	.	1	6	7	.	.	51	E	SOCIALES
1.6 Law	T	16	18	13	27	20	.	10	11	23	1	2	141	T	1.6 DROIT
	S	13	13	9	23	16	.	9	10	20	1	2	116	S	
	A	3	5	4	4	4	.	1	1	3	.	.	25	E	
2.0 Exact sciences	T	24	24	15	40	22	.	16	5	24	25	54	249	T	2.0 SCIENCES
	S	18	21	10	31	19	.	15	3	15	23	39	194	S	EXACTES
	A	6	3	5	9	3	.	1	2	9	2	15	55	E	
2.1 Natural sciences	T	64	48	30	61	54	.	20	1	50	5	55	388	T	2.1 SCIENCES
	S	43	39	15	38	46	.	19	1	38	3	43	285	S	NATURELLES
	A	21	9	15	23	8	.	1	.	12	2	12	103	E	
3 Medicine	T	74	118	2	74	106	.	1	.	109	.	9	493	T	3 MEDECINE
	S	64	102	1	60	86	.	1	.	90	.	8	412	S	
	A	10	16	1	14	20	.	.	.	19	.	1	81	E	
4 Engineering sciences	T	.	.	.	9	.	.	7	.	.	82	127	225	T	4 SCIENCES
	S	.	.	.	5	.	.	5	.	.	61	99	170	S	TECHNIQUES
	A	.	.	.	4	.	.	2	.	.	21	28	55	E	
TOTAL	T	254	294	142	332	316	15	104	58	324	115	200	2223	T	TOTAL
	S	196	238	82	224	257	11	92	49	244	90	206	1689	S	
	A	58	56	60	108	59	4	12	9	80	25	63	534	E	

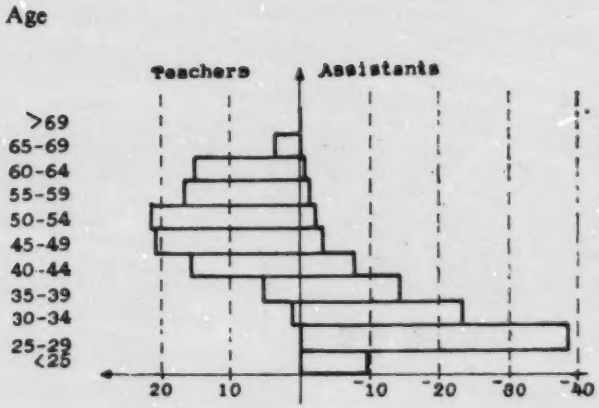
T = Total
S = Swiss
A = Foreigners

BEST COPY AVAILABLE

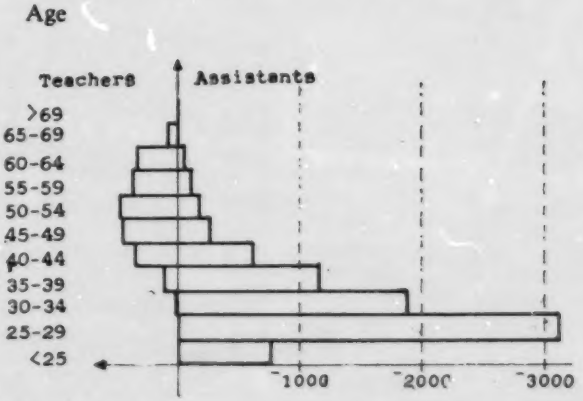
Table 7

Pyramid of Ages of the Teaching Profession 1983

Absolute Values



Relative Values (%)

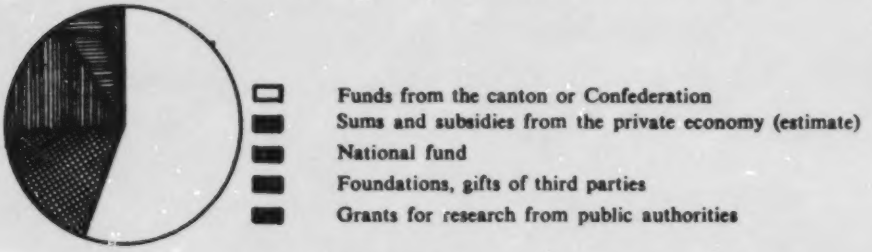


Source: Statistic on the staff of Swiss universities, 1983

BEST COPY AVAILABLE

Table 8

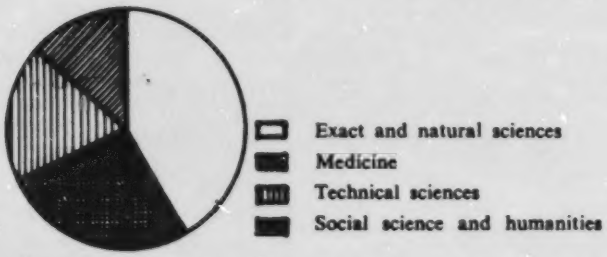
Expenditures on Research and Development in Swiss Higher Education Institutions Broken Down by Sources of Financing, 1975


Funds from the canton or Confederation
Sums and subsidies from the private economy (estimate)
National fund
Foundations, gifts of third parties
Grants for research from public authorities

Source: Federal Office of Statistics, Bern, 1980.

Table 9

Research and Development Expenditures in Swiss Higher Education Institutions according to Groups of Disciplines, 1975



Source: Federal Office of Statistics, 1977.

Table 10

Research and Development Expenditures in Relation to the Number of Teachers, 1975

Scientific Field	Research and Development Utilization Expenditures		Teachers [1]		Expenditures for the use of Research and Development by Teacher
	Percent	Swiss francs in thousands	Percent	Persons	Swiss francs in thousands
Humanities and social sciences	14	59,460	41	2,232	26,640
Exact and natural sciences	41	173,280	26	1,398	123,950
Medicine	28	117,660	24	1,287	91,420
Engineering sciences	17	74,050	9	497	148,990
	100	424,450	100	5,444[?]	78,400[2]

[1] – University teachers encharged with a full-time course of instruction (including teachers on leave of absence)
– University teachers on part-time schedules
– Assistants

[2] If one includes estimated research and development investments, research and development expenditures rise to 94,500 francs.

Source: Federal Office of Statistics, Bern, 1977.

APPENDIX 11

EXAMPLES OF CURRICULA

I Law
II Economic sciences
III Engineer — chemist
IV Pedagogical training for secondary school teachers
V Postgraduate studies:
(a) — land management
(b) — scientific foundations for air protection

I. Studies in Law

The University of Fribourg

Conditions for admission

— Federal (or cantonal) Certificate of *maturité* A or D, C (by means of a further examination in Latin)
— Any equivalent titles (according to the judgment of the faculty).

Schedule of studies with the number of semesters

Licence: 7 to 8 semesters

Doctorate: 2 to 3 semesters or more (no established minimum)

Licence

(A) second semester
Written:
(a) Introduction to Law
(b) Philosophy of Law, or, optionally, General Public Law
(B) fourth semester
Written:
Roman Law
(C) fourth semester
Oral:
(a) Roman Law
(b) Penal Law and Penal Procedure
(c) Public International Law
(d) History of Swiss Law
(e) General Political Economy [economics]
(f) Philosophy of Law, or General Public Law — i.e. that one of the two branches which was not the object of the written examination (A), (b)

Comments: Practice recommends a system which we advise:
(a), (b), (c) up to the end of the fifth semester
(d), (e), (f) up to the beginning of the fifth semester
(D) sixth semester/seventh semester
Written:
(a) Swiss Civil Code and Federal Bond [recognizance] Code
(b) One branch to be chosen from among the disciplines (E), (c) through (f) below
(E) seventh semester/eighth semester
Oral:
(a) Swiss Civil Code
(b) Federal Bond Code
(c) Civil Procedure and Prosecutory Law
(d) Swiss Constitutional Law and Administration Law
(e) Canon Law
(f) Private International Law

Remarks: Foreigners speaking the French language can replace (D), (a), and (E), (a) with Civil Law and Commercial Law (the same possibilities, respectively, are afforded to pupils of German nationality)

Doctorate

(A) Written and oral tests are not required except by candidates who have not obtained at least a mention of *cum laude* with their *licence*.
Written tests:
(a) Swiss Civil Code and Federal Bond Code as well as Commercial Law.
(b) One branch to be chosen from among (C), (a) through (d), (f) and (E), (a) through (f)
Oral test:
All the branches mentioned under letters (A), (B), and (E) with the exception of (C), (e)
(B) Thesis: scientific work on subject of choice
(C) A paper *[mémoire]*, a shorter work but on an assigned subject and within 14 days.

Comments on the examinations:

Seminars:

Four seminar works are required of a candidate for *licence*. They are chosen by the student himself and their acceptance by the professor is a condition for admission to the *licence* examination.

Rating standard:

(a) Written tests: each receives a grade

(b) Oral tests: at the end of each session, the examiners deliberate. If the candidate is accepted, he is given grades for the oral test according to the following scale: (1) passing, (2) *cum laude*, (3) *magna cum laude*, (3.5), (4) *summa cum laude* (4 is the highest grade).

Sessions:

beginning of winter semester
end of winter semester
end of summer semester
Ancillary branches: Optional and without examination
Legal editing
Fiscal law
Intellectual rights
Labour law
Social Insurance law
Journalism, etc.
Each branch is accompanied by practical projects (exercises in private law, penal law) that are optional.
Optional visits are also organized (Federal court, official registry, penitentiary, etc.)

II. Economic Sciences

University of Geneva
Faculty of economic and social sciences
Licence in commercial and industrial sciences, with specialization *[mention]* in business management, and in management information processing

Specialization in Business Management
(B) second series of examinations
(C) short paper *[mémoire]* for *licence]*
(D) third series of examinations

(1) joint track with two options
(2) (A) first series of examinations
(3) specialization in management information processing
(4) (B_1) second series of examination
(5) (C_1) short paper for *licence*
(6) (D_1) third series of examinations

For all *licences*, candidates must have taken an active part, recognized by the granting of certificates, in all seminars provided in the curricula, which permits them to enroll in the examinations. The *licence* examinations are in three series divided in two semi-series. The candidate may reverse the order of the two semi-series provided by the regulations or go through the two semi-series in the same session. In all cases, the two semi-series are evaluated together; however, if one semi-series has been passed, it is granted to the candidate. For all courses of instruction in the faculty a good knowledge of English is desiderable.

Comments on Curricula

1. *Licence* in economic sciences with specialization in political economy [economics]

(A) First series of examinations

First semi-series	Written:	Mathematics I and Elements of the Calculus of Probability / Financial Mathematics / Accounting
	Oral:	Elements of General Public Law
Second semi-series	Written:	Political Economy I / Economic and Social Observation
	Oral:	Bond Law I / Human and Economic Geography I / General Economic History / Sociology I / Introduction to Business Economics

(B) Second series of examinations

First semi-series	Written:	Statistic I / National Accounting
	Oral:	Public Economics / Economic History / (A) option: Demography (written examination) / Human and Economic Geography / Sociology II / Political Science I / Structure of the Market
Second semi-series	Written:	Political Economy II / Financial Economy I
	Oral:	Evolution of Economic Thought / Elements of Public Law and Elements of Private and Economic Law

(C) Short paper for *licence*

The subject for this paper is proposed to the Department of Political Economy at the end of the second year of study. The defense takes place in the third year before the presentation of the second semi-series of the third series of examinations, of which it is an integral part

(D) Third series of examinations

First semi-series	Written:	Monetary Analysis / Elements of Econometrics
	Oral:	Economic History / (A) option: Human and Economic Geography / Political

		Science I / Political Science II* / Sociology II / Sociology III / Technical Economics [technico-économic]
Second semi-series	Written:	Political Economy III / Public Finances
	Oral:	National Economics / Exercises in Reading Economic Texts / Defense of the *licence mémoire* / Analysis and Financial Management II / Defense of the *licence mémoire*

2. *Licence* in economic sciences, specialization in quantitative methods

(A) First series of examinations

First semi-series	Written:	Mathematics I and Elements of the Calculus of Probability / Financial Mathematics / Accounting
Second-semi-series	Written:	Economic and Social Observation
	Oral:	Political Economy I / Bond Code I / Elements of General Public Law / Human and Economic Geography / General Economic History / Sociology I / Economic History I

(B) Second series of examinations

First semi-series	Written:	Mathematics II / Statistics I / Demography
Second semi-series	Written:	National Accounting / Technical Economics / Political Economy II and Evolution of Economic Thought / (A) option: Analysis and Financial Management I / Human and Economic Geography / Economic History II

(C) Third series of examinations

First semi-series	Written:	Mathematical Methods for Optimalization in Economics / Statistics II
	Oral:	Computer Programming
Second semi-series	Written:	Econometrics I / Public Finances / Political Economy III

* Students who choose the option Political Science II or Sociology III option as an oral examination must have gone through the corresponding course in the second year.

3. *Licence* in commercial and industrial sciences, specialization in business management and in management information processing

(A) First series of examinations

First semi-series	Written:	Accounting / General Political Economy
	Oral:	Bond Code I / Elements of General Public Law
Second semi-series	Written:	Elements of Mathematics and Statistics / Financial Mathematics / Economics and Social Observation
	Oral:	Introduction to Business Economics / Human Relations and Technology / Introduction to Information Processing / Optional disciplines: Geography or Sociology or Economic History

(B) (B) The second series of examinations

First semi-series

Specialization in business management	Written:	Application of Statistics to Business / Corporation Law
	Oral:	Theory and Practice of Budgeting / Elements of Economic Public Law and Social Economic Law / Bond Code II / Fiscal Law
Specialization in management information processing	Written:	Application of Statistics to Business / Informational Analysis I
	Oral:	Theory and Practice of the Budget / Structures of Information / Programming and Programming of Systems
Second semi-series (for the two specializations)	Written:	Analysis and Financial Management I / Management Supervision I
	Oral:	Public Economy / Marketing I / Administrative Economics I

(C) (C_1) *Mémoire* for *licence* — The subject of the short paper for a *licence* is proposed to the department at the end of the second year of study.

		Defense takes place during the third year, before presentation of the second semi-series of the third series of examinations, of which it is an integral part.
(D) (D_1) Third series of examinations		
First semi-series Specialization in business management ment		Two possible options:
Option in finance	Written:	Analysis and Financial Management II / Legal Economics and Financial Problems of Business
	Oral:	Financial Institutions and Markets, and Bank Management
Option in marketing	Written:	Marketing II
	Oral:	Marketing II / Analysis and Financial Management II / Human and Production Relations
Specialization in information processing management	Written:	Informational Analysis II
	Oral:	Analysis and Financial Management II / Advanced Methods of Programming / Informational Systems of Management
Second semi-series (for the two specializations)	Written:	Supervis on of Management II /Administrative Economics
	Oral:	Business Policies / Operational Research / Defense of the *mémoire* for a *licence*

Further Education

Diploma in econometrics

Conditions of enrollment: the following are authorized to enroll in course of instruction for a diploma in econometrics:

— candidates for a *licence* in economic sciences, specializing in quanti-

The courses of instruction, lasting one year, deal with econometrics, quantitative economics, statistics, and more generally mathematical methods in economics. To obtain the diploma, students are rated on their work over

tative methods, having passed the first semi-series of the third series of examinations;

— students with *licences* in economic sciences and specialization in quantitative methods after a lapse of two years after obtaining their diploma;

— holders of a title adjudged to be the equivalent by the faculty; these students may be required to pass further examinations before enrollment.

Doctorate in Economic and Social Sciences

The faculty grants a doctorate in economic and social sciences combined with one of the following specializations: economic history, sociology, geography, political science, political economy, econometrics and statistics, commercial and industrial economics. Conditions for admission: the following may be candidates for a doctorate:

— those holding a *licence* or a diploma from the faculty corresponding to the specialization of the chosen doctorate:

— holders of titles or diplomas judged to be equivalent by the faculty. These students are generally required to pass further examinations before their enrollment as candidates for a doctorate.

the year and the results of four examinations (two written, two oral) as well as the defense of a short paper bearing on one of the branches taught within the framework of the diploma course.

Pre-mémoire: The faculty requires candidates to write a preliminary short paper on a subject having to do with the specialization of the doctorate chosen.

A preliminary short paper *[préliminaire mémoire]* for a thesis and a thesis: having satisfied the preceding conditions, the candidates undertake to write a preliminary short paper; if it is accepted they are authorized to undertake the writing of their doctorate.

III. Curricula in the Section for Engineers and Chemists — Federal Institute of Technology of Lausanne

Semester	1			2			3			4			5			6			7			8			
Material	c	e	l	c	e	l	c	e	l	c	e	l	c	e	l	c	e	l	c	e	l	c	e	l	
General Mathematics	4	2		4	2																				150
Chemical Calculations							2	1																	45
Programming				1	2																				30
Planning of Chemical Experiments							2	1																	45
General Physics	4	1		4	1		4	1																	200
General Metallurgy				1															1	(1)					25
Mineralogy	3	2																							75
Applied Mechanics							2																		30
Static and resistance of materials										2															20
Units of Machinery														3											45
Designing and Drafting																	4								40
Electricity																			2	1					45
General and Mineral Chemistry I, II	4			2																					80
General Analytical Chemistry	1	1																							30
Further Analytical Chemistry I, II	1			1			1																		25
Instrumental Analysis																									15
Metal States I, II										2			1												35
Mineral Chemistry I, II																2			1						35
Mineral and General Chem. TPD			16			16																			400
Mineral and Analytic Chem. TPA														8											120
General Organic Chemistry I, II				5	1		1																		75
Reaction Mechanisms I, II							2	1		2	1														75
General Organic Chemistry III										1															10
Methods of Synthesis																			2						30
Organic Structure and Analysis																2									20
Stereochemistry													2												30
Organic Chemistry TPD									16																240
Organic Chemistry TPA														8				16							280
Electrochemistry and the Chemistry of Surfaces																									30

BEST COPY AVAILABLE

Thermodynamics I, II							2	1		2	1																75
Spectroscopy I, II														2	1		2	1			2					105
Kinetics																	2	1								30
Electrochemistry										2	1															30
Radiochemistry and Nuclear Chem.							1	1																		30
Electrochemistry and Radiochem. TP												6									16					180
Physical Chemistry TP												16									16					280
Industrial Chemistry										2	1			2	1		2	1		2	1					120
Chemical Engineering I, II, III														2	1		2	1								75
Transfer Phenomena														2	1						8					120
Chemical Engineering TP														2												30
Dyes																						1				10
Industrial Hygiene																			(2)							
Industrial Legislation																			(1)			(1)				
Simulation																			(2)							
Advanced Physical Chemistry																			(2)							
Automatic Regulation																										
Colloquium on Physical Chemistry I																										
Electrochemistry I Mineral Chemistry																			(2)							
Electrochemistry, selected chapters																			(2)			(2)				
Theoretical Organic Chemistry																			(2)							
Chemical Calculations									(2)	(1)									(1)	)x		(1)	)x			
Conferences in Chemistry																										
	17	6	16	18	6	16	17	6	16	13	4	22	15	4	16	12	8	16	8	4	24	1				
Courses of choice ( ) Optional courses — Total — by week	39		40		39		39		35		36		36		1											
by semester	585		400		585		390		525		360		540		10										3395	

x Every fifteen days
c = course, e = exercises, l = laboratory

BEST COPY AVAILABLE

IV. The Pedagogical Training of Secondary School Teachers in the Canton of Vaud

1. *General comments*

The pedagogical training of secondary school teachers is under the Department of Public Education and Religion. The basic pedagogical training of secondary school teachers is provided in the Teachers Training College for Secondary Education [*Séminaire pédagogique de l'enseignement secondaire* — SPES]

1.1. Pedagogical training is *after* academic studies and not integrated with them. It is provided in parallel with a practical on-the-job period (each student teacher has 6 to 12 hours of instruction to give, and a dozen hours of courses and seminars to attend — duration one year).

1.2. To be admitted, the candidate must have obtained a *licence* from the University of Lausanne (State Diploma or diploma recognized by the State) in letters, sciences, or economic sciences, or have a certification of an examination for the secondary school teacher diploma, or the Vaud canton certificate for special courses of instruction.

Studies leading to the obtaining of these titles must be fully completed at the latest during the July session preceding the beginning of teacher training studies.

1.3. Equivalence can be accorded by the department only to titles such as *licence* (university diploma) from the University of Lausanne, *diplôme* of the Lausanne Federal Institute of Technology [EPFL], the Zürich Federal Institute of Technology [EPFZ], or *licences* of other universities, either Swiss or foreign, when, there being no candidature for a teaching post put up for competition for the first time, a second competition proves to be necessary.

In case of a proposal for nomination, the candidate whose titles have been recognized as equivalent by the department is required to pass through one year of teacher training.

1.4. The student teacher is hired by the state on a private law contract valid for one school year. He is remunerated in the form of a lump sum annual indemnity. In particular cases, for married student teachers with families, other conditions of payment are effected.

2. "*Academic*" *education*

Studies for obtaining a *licence* in letters comprise a major branch and two secondary branches. Students who intend to make a career in secondary school teaching must necessarily choose two disciplines fundamental to the curricula of secondary school establishments, one of which must be a language.

In the scientific track, students must have two preliminary examinations and complete two or three certificates to obtain a *licence* in natural sciences, mathematics, physics, or chemistry. Candidates for a *licence* in economic sciences can choose specialization in political economy or in business management. The duration of university studies varies between six and twelve semesters.

The studies of candidates for a certificate of secondary school teacher comprise French, foreign language (German, English, or Italian), history and geography. The course of studies lasts five semesters, of which two semesters at least must be abroad.

Preparation for obtaining a certificate for special courses of instruction is given at the cantonal School for Fine Arts for teachers of drawing or at the Conservatory of Lausanne for music teachers — duration six semesters.

3. *Professional education*

3.1. In the educational sciences, alternation of courses and group work in psycho-pedagogy, general didactics, and studies of problems inherent to school maladjustment. A total of 200 hours minimum per year.

3.2. Didactics (methodology) and practice:

3.2.1. Student teachers as a rule follow courses in special didactics in two disciplines (in exceptional cases one or three) plus a seminar on audiovisual aids MAV.

3.2.2. The practical period is an on-the-job period of six to twelve hours per week. Practically, eight to twelve hours weekly teaching in one or several classes.

3.2.3. In addition, student teachers are required to have contacts with the SPES, with its teachers, and with student teachers of the preceding year; preparation, in collaboration with specialists in method, of the first lessons to be given.

3.3. Examinations in relation to professional education:

3.3.1. For the educational sciences and didactics, there is no formal examination but an ongoing evaluation. From 1978—79, student teachers will have to submit a personal (or group) work attesting that they have met the demands. During the first two years, which are experimental, the results obtained on this work will have no effect on the decision to grant or refuse the certificate. At the end of this period, the rating "Satisfactory" will be required.

3.2.2. The instruction given by student teachers (practical stage) is the subject of an ongoing evaluation made by the administration of the establishment where the practical apprenticeship is taking place, by the administration of the SPES, and by didactics teachers.

3.3.3. The certificate of aptitude for secondary school teaching is given to the candidate when his teaching has been satisfactory, provided the candidate has fulfilled all the requirements set for the courses and seminars and he has participated regularly in the seminars on special didactics as well in the other activities that are part of the program.

4. *Recognition of certificates*

This does not exist strictly speaking. Nonetheless, concessions can be accorded from case to case to holders of certificates of teaching aptitudes from other cantons.

5. *Special comments*

The Department grants by means of the SPES the certificate of aptitude for secondary school instruction, which grants the right to teach at the following levels:

— lower secondary (5 to 9 = secondary school of five years of study);
— higher secondary (10 to 11—12 = gymnasium of 2 or 3 years of study).

6. *Glossary*

Certificate of aptitude for secondary school instruction: Title granted to student teachers at the end of the year of pedagogical training.
Course in special didactics: Seminars in methodology of the various disciplines.
Didactics teacher: Teacher of methodology at the SPES.
Secondary school apprentice teacher: Student teacher at the SPES.
On-the-job apprenticeship: Practical stage of a student teacher of the SPES. The student teacher is responsible for one or several classes and is not under the direct supervision of a mentor.

V. Postgraduate Studies

(a) Land management — at the Federal Institute of Technology at Zürich.

Goals

— to understand the social, political, and ecological responsibility that a specialist in land management must assume;
— to know the theories, practices, and methods of land management as well as the disciplines that are essential to this job;
— to carry out technical procedures and systematically deal with the problems of management;
— to be able to apply and deepen knowledge independently in matters of management acquired during basic studies;
— experiments with interdisciplinary work as a counsellor, member of a group, and director of a project.

Duration and participants

Duration: 2 years. 16 to 25 participants in a course (architects, geographers, forestry engineers, construction engineers, economists, sociologists, agronomic engineers and rural engineers, lawyers, and landscape architects).

The conditions for obtaining a certificate are:

(a) passing of examinations in seven branches (methodology, landscaping, habitat, transport, economics, society, and law);

(b) participation in two group projects;
(c) the writing of a satisfactory individual paper.

(b) Courses of specialization on the scientific foundations of air protection — session 1979 — Federal Institute of Technology of Lausanne

1. The importance of problems bearing on pollution of the atmosphere has induced the EPFL (through the Department of Mechanics and Turbulence of the working group EPFL — ISM [Institut Suisse de Meteorologie]) to organize, with the support and the collaboration of interested national and international organizations, a postgraduate course on the scientific foundations of air protection.

2. *Structure*

The structure and general program of the course were reformulated in the light of the experience acquired during the preceding sessions and of the needs and proposals expressed by interested national and international organizations.

2.1. The course of instruction, which is full time, comprises:
(a) integrated courses and exercises
(b) practical work
(c) programmed personal work
(d) seminars, visits, and demonstrations
(e) a practical apprentice period
(f) examination tests and the writing of a final paper.

2.2. *Schedule*
The hours devoted are divided up as follows:

2.2.1. Hours of joint classes:		
basic course and integral exercises		170 hours
joint practical projects		20 hours
course, conferences given during the specific orientation phase		70 hours
	Total	260 hours
2.2.2. Hours of the "orientation" class:		
course and integral exercises		30 hours
practical project		60 hours
	Total	90 hours
Total class hours		350 hours
2.2.3. Hours outside the classroom: personal programmed work, seminars, visits, demonstrations, examinations, final papers		90 hours
2.2.4. Practical apprentice period	About	6 weeks

2.3. *Language*
Instruction will be given essentially in French.

3. *General programme*

3.1. *Course and exercises*

The topics of the courses, exercises, and conferences are broken down into seven main groups:

3.1.1. Mathematical and physical foundations

Random mechanics of turbulence, theory of atmospheric turbulence, mathematical and physical modeling of atmospheric dispersion, statistical methods and models, data processing, data banks, aspects of thermodynamics of irreversible processes.

Joint hours:	50
PA [physique atmosphérique — atmospheric physics] orientation hours	15
Total	65

3.1.2. Meteorology and climatology or atmospheric pollution

Synoptic, dynamic, and thermodynamic meteorology of the atmosphere, micro-meteorology; the physics of clouds and precipitation, interactions with low strata; meteorology and climatology of turbulent dispersion, the outer planetary strata, dispersion in an urban environment and a mountainous environment; apparatus; networks and standards of atmospheric measures; radiant energy balance, aspects of forecasting atmospheric pollution.

Joint hours:	50
PA orientation hours	15
Total	65

3.1.3. Chemistry of atmospheric pollution

Composition of the atmosphere, classification of pollutants, chemical reactions and transformations of pollutants, chemistry of the stratosphere, aerosols, ions, trace elements, chemistry of urban pollution, odors; equipment, networks, and standard of measures of pollutants, analysis of measures *in situ* and in the laboratory; microscopy, analysis of precipitation.

Joint hours:	50
CA [*chimie atmosphérique* — atmospheric chemistry] orientation hours	15
Total	65

3.1.4. Sources of pollution

Classification of sources, emission pattern, technology and physical and chemical aspects of purifying procedures, measurement and analysis of pollutants at emission.

Joint hours:	10
CA orientation hours	10
Total	20

3.1.5. Effects of atmospheric pollution

Effects on man, animals, crops, buildings, elements of environmental toxicology, physiopathology, biological effects, bio-indicators, land-air-water interaction; impact on the local regional and global climate, thermic pollution.

Joint hours: 35
CA orientation hours 5
Total 40

3.1.6. Principles of control, economic and social aspects

Reduction of emissions at the source, emission norms, legislation, cost of pollution, planning resources, managing air quality, land management, zoning, analysis of systems, methodology for evaluating the impact, goal, and tasks of national and international institutions, role of the specialist in atmospheric environment, organization of an air protection service.

Joint hours: 25

3.1.7. Atmospheric environment and other aspects of environmental pollution

Historical and present situations of environmental pollution, introduction to ecology, cycles, global transport of pollution, exchange with the sea, aspects of paleoclimatology, radioactive pollution of the atmosphere, transfer in the biosphere, principles and application of spatial teledetection, energy environment, aspects of the environment.

Joint hours: 20

3.2. *Practical projects*

The practical projects are intended on the one hand for the pursuit of certain exercises begun in class and, on the other hand, for carrying out manual operations which for the most part have direct bearing on the work which the participants will later have to carry out or supervise during their professional activity.

A first period of practical work (20 hours) takes place during the period of the basic course and deals with general themes. Then the practical projects of orientation in atmospheric physics will in broad outline comprise aspects of the measurement of meteorological factors (network, apparatus, sampling), of the treatment and analysis of climatological facts, and of the forecast of emissions and the determination of the dimensions of chimneys. The practical projects in orientation in atmospheric chemistry will deal with field measurements of emission (network, equipment, standards), laboratory analysis of samples (chemical microscopic analysis), and the statistical treatment of results.

3.3. *Apprenticeship status*

During the second part of the course of instruction, several advanced full-time apprenticeship periods will be organized in various institutions in the public and private sectors. The participants will then be in contact with theoretical and practical work in process in these institutions. Among the subjects proposed, the following will figure: the theoretical and experimental study of turbulence, predictive models of pollution, dispersion of pollutants over uneven terrain, the meteorological effects of cooling towers, and various instrumental studies bearing principally on the exploration of the lower atmosphere.

4. *Teachers*

Instruction will be given by persons chosen from among the teaching body of the Federal institutes of technology of Lausanne and Zürich, as well as by Swiss and foreign specialists in the area of atmospheric environment.

5. Admission

The candidates must be holders of a diploma acquired in the Institute of Technology or a faculty of sciences of a university, or be able to show an equivalent title. As a rule, the course is meant for persons already involved in the protection of the atmospheric environment and having some years of experience. The candidates must also have good knowledge of mathematics, statistics, physics, and general chemistry. Some knowledge of information science is also desirable.

If necessary, the candidates may be asked to take a preparatory refresher course which will be given about one to two months before the principal course.

Addresses of Institutions of Higher Education

— Eidgenössische Technische Hochschule
Rämistrasse 101
CH-8006 Zürich
— Ecole polytechnique fédérale
Avenue de Cour 33
CH-1007 Lausanne
— Universität Basel
Kollegienhaus
Petersplatz 1
CH-4051 Basel
— Universität Bern
Hochschulstrasse 4
CH-3012 Bern
— Université de Fribourg
CH-1700 Fribourg
— Université de Genève
Place de l'Université 3
CH-1211 Geneva
— Université de Neuchâtel
Avenue du 1er mars 26
CH-2000 Neuchâtel
— Hochschule St. Gallen für Wirtschafts- und
Sozialwissenschaften
Dufourstrasse 10
CH-9000 St. Gallen
— Université de Lausanne
Place de la Cathédrale 4
CH-1000 Lausanne 17
— Universität Zürich
Rämistrasse 71
CH-8006 Zürich

NOTES

1. WEBER, K. *Hochschule — Arbeitsmarkt — Bildungspolitik* (Universities — Labour Market — Educational Policies). In: *Bildungsforschung und Bildungspraxis*, Zug, Vol. 1, No. 1, 1979.
2. SWISS Association for University Guidance / Association suisse pour l'orientation universitaire / (ASOU). *Enquête sur la situation de l'emploi des nouveaux diplômés des universités suisses 1977* (Study on the Employment Situation of Recent University Graduates). In: *Politique de la science*, Bern, Supplement 16, 1978.
3. FEDERAL Office of Statistics, Bern, 1980.
4. RIES, H. *Studienverlauf und Studienerfolg an Schweizer Hochschulen* (Studies and Study Success in Swiss Universities). Aargau, 1973.
5. E.g., RIES, H., *Studienverlauf und Studienerfolg an Schweizer Hochschulen* (Studies and Study Success in Swiss Universities), Aargau, 1973; PETER, M.U. and ZEUGIN, P. G., *Zur ökonomischen Lage der Studenten an der Universität Zürich* (The Financial Situation of Zürich University Students), Zürich, 1985; KOCH, Th., *Berufserwartungen, Berufsrealitet* (Job Expectations and Realities), Bern, 1975.
6. SWISS Council of Science. *Third Report on the Development of the Universities*, p. 423.
7. Ibid., p. 215.
8. Ibid., p. 215.
9. Statistics of the *Commission Intercantonale des bourses d'études* (CIBE).
10. FEDERAL Office of Statistics. *Enquête sur le personnel et les moyens financiers des hautes écoles Suisses affectés à la recherche et au développement* (Study on the Staff and Finance Used for Research and Development of Swiss Universities). Bern, 1977.
11. SWISS Council of Science. *Third Report on the Development of Swiss Universities*. Part 1, p. 9 (see Tables 8, 9, and 10 in the Appendix).

82

BEST COPY AVAILABLE

BIBLIOGRAPHY

ASSOCIATION suisse pour l'orientation universitaire (ASOU). *Enquête sur la situation de l'emploi des nouveaux diplômés des universités suisses* (Study on the Employment Situation of Recent University Graduates). Bern, Politique de la science, Supplement No. 16, 1979.

CONSEIL suisse de la science. *Troisième rapport sur le développement des hautes écoles suisses* (Third Report on the Development of Swiss Universities). Bern, 1978.

CRAUSAZ, R. *La diversification de l'enseignement tertiaire en Suisse* (Diversification of Tertiary Education in Switzerland). In: *La réforme de l'enseignement tertiaire dans l'Europe d'aujourd'hui* (Reform of Tertiary Education in Europe Today). Strasbourg, Council of Europe, 1978.

CRAUSAZ, R. *Higher Education in Switzerland.* In: *European Journal of Education*, Amsterdam, The European Cultural Foundation, Vol. 14, No. 1.

DEPPELER, R. *Conférence universitaire suisse : Six ans de Conférence universitaire, essai de bilan par le secrétariat* (Swiss University Conference: Secretariat Evaluation of Six Years Functioning). Bern, 1975.

EGGER, R., and BLANC, E. *L'enseignement en Suisse* (Education in Switzerland). Centre suisse de documentation en matière d'enseignement et d'éducation, Geneva, 1974.

FLAMMER, E. *Uebersicht über die Schweizerischen Hochschulerlasse* (Overview of Decrees and Laws on Swiss Universities). Bern, 1975—77—78.

RIES, H. *Studienverlauf und Studienerfolg an Schweizer Hochschulen* (Studies and Study Success in Swiss Universities). Aargau, 1973.

SCHEURER, H. *L'aide aux universités* (Aid to Universities). Office fédéral de l'éducation et de la science, Bern, 1974.

SCHEURER, H. *Das Schweizerische Hochschulwesen* (Swiss Higher Education). Bern, 1975.

WEBER, K. *Hochschule — Arbeitsmarkt — Bildungspolitik* (Universities — Labour Market — Educational Policy). In: *Bildungsforschung und Bildungspraxis*, Zug, Vol. 1, No. 1, 1979.

See also:

Office fédéral de la statistique, *Statistiques universitaires (Système d'information universitaire suisse*, SIUS).

Loi fédérale sur l'aide aux universites du 28.6.1968.

Message du Conseil fédéral à l'Assemblée fédérale concernant l'aide aux universités, du 28.11.1967.

Message dù Conseil fédéral à l'Assemblée fédérale concernant l'aide aux hautes écoles et la recherche, du 4.10.1976.

Message du Conseil fédéral à l'Assemblée fédérale concernant la nouvelle loi sur la formation professionnelle, du 26.1.1977.

Message du Conseil fédéral à l'Assemblée fédérale concernant l'encouragement de la recherche scientifique pour la periode 1980—1983, du *5.3.1979.*

Arrêté fédéral sur les écoles polytechniques fédérales, réglementation transitoire, du 24.6.1970.

Messages du Conseil fédéral à l'Assemblée fédérale concernant la prorogation de l'arrêté fédéral du 24.6.1970 sur les écoles polytechniques fédérales (réglementation transitoire), du 20.11.1974 et du 24.9.1979.

83 BEST COPY AVAILABLE

Printed by: ILEXIM
BUCHAREST — ROMANIA

OTHER CEPES PUBLICATIONS

NEW FORMS OF HIGHER EDUCATION IN EUROPE

(Report on a symposium organized at CEPES, 13–15 January 1976. Articles are written in English, French or Russian). Bucharest, 1976, Bibliogr., 185 p.

THE CONTRIBUTION OF HIGHER EDUCATION IN EUROPE TO THE DEVELOPMENT OF CHANGING SOCIETIES

(Report on a symposium organized at CEPES, 21–23 Sept. 1976. Articles are written in English, French or Russian). Bucharest, 1977, Bibliogr., 179 p. (Out of print)

STATISTICAL STUDY OF HIGHER EDUCATION IN EUROPE 1970—1975

(In English and French) Bucharest, 1978, 192 p. (Out of print)

CONSULTATION FOR THE PREPARATION OF A STUDY ON ACCESS TO HIGHER EDUCATION IN EUROPE

(Report on a symposium organized at CEPES, 18–20 October 1977. Articles are written in English, French or Russian). Bucharest, 1978, Bibliogr., 191 p.

ACCESS TO HIGHER EDUCATION IN EUROPE

Bucharest, 1981, 90 p. (also available in French and Russian)
ISBN 92-3-101942-2

INTERUNIVERSITY CO-OPERATION IN THE EUROPE REGION

Bucharest, 1981, 80 p. (also available in French and Russian)
ISBN 92-3-101941-4

L'ENSEIGNEMENT SUPERIEUR EN ROUMANIE

Bucharest, 1978, 105 p. (in French only)

DIRECTORY OF HIGHER EDUCATION RESEARCH INSTITUTIONS

Prepared by CEPES, Bucharest. Published by IBE, Geneva, 1981, 139 p. Index

DISTANCE EDUCATION FOR THE UP-DATING OF KNOWLEDGE AT POSTGRADUATE LEVEL

Report on a symposium organized by CEPES. (Articles are written in English or French). Bucharest, 1982, Bibliogr., 113 p.

HIGHER EDUCATION AND MANPOWER PLANNING

A comparative study of planned and market economies
(O. Fulton, A. Gordon, G. Williams ed.)
A joint project undertaken by the ILO and Unesco Centre for Higher Education (CEPES)
Published by ILO, Geneva, 1982, Bibliogr., 127 p.
ISBN 92-2-102973-5

INTERDISCIPLINARITY IN HIGHER EDUCATION

A study established by Thor Einar Hanisch following a symposium organized by the European Centre for Higher Education in Bucharest, 24–26 November 1982.
Bucharest, 1983, Bibliogr., 107 p.

HIGHER EDUCATION AND ECONOMIC DEVELOPMENT IN EUROPE 1975—1980

(A statistical and economic study)
A study, in two volumes, established by Professor Petre Burloiu, drawing on sources from the UN, UNESCO, ILO, the World Bank, etc., and on statistical data provided by Member States.

Bucharest, 1983, 2 vols.
ISBN: 92-3-002232-X.

To obtain these publications please write to:

European Centre for Higher Education
39 Stirbei Vodă Street
Bucharest, Romania

MONOGRAPHS ON HIGHER EDUCATION

1. Higher Education in Switzerland (French 1981, English 1984)
2. Higher Education in the United States (1982)
3. Higher Education in Norway (1983)
4. Higher Education in Bulgaria (1983)
5. Higher Education in the German Democratic Republic (1983)
6. Higher Education in the Byelorussian SSR (1983)